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ADVERTISEMENT.

The extension of the scope of the National Museum during recent years and the activity of the collectors employed in its interest have caused a great increase in the amount of material in its possession. Many of the objects gathered are of a novel and important character, and serve to throw a new light upon the study of nature and of man.

The importance to science of prompt publication of descriptions of this material led to the establishment, in 1878, of the present series of publications, entitled "Proceedings of the United States National Museum," the distinguishing peculiarity of which is that the articles are published in pamphlet form as fast as completed and in advance of the bound volume. The present volume constitutes the twenty-second of the series.

The articles in this series consist: First, of papers prepared by the scientific corps of the National Museum; secondly, of papers by others, founded upon the collections in the National Museum; and, finally, of facts and memoranda from the correspondence of the Smithsonian Institution.

The Bulletin of the National Museum, the publication of which was commenced in 1875, consists of elaborate papers based upon the collections of the Museum, reports of expeditions, etc., while the Proceedings facilitate the prompt publication of freshly acquired facts relating to biology, anthropology, and geology, descriptions of restricted groups of animals and plants, the discussion of particular questions relative to the synonomy of species, and the diaries of minor expeditions.

Other papers of more general popular interest are printed in the Appendix to the Annual Report.

Papers intended for publication in the Proceedings and Bulletin of the National Museum are referred to the Advisory Committee on Publications, composed as follows: Frederick W. True (chairman), Marcus Benjamin (editor), James E. Benedict, Otis T. Mason, Leonhard Stejneger, and Lester F. Ward.

S. P. Langley,
Secretary of the Smithsonian Institution.

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ERRATA.

Page 509, line 21, *for* varicosa *read* cicatricosa.
Page 516, before Heterogenæ *insert* Exobranchiæ.
Page 548, line 36, Unio striatus Sowerby should be preceded by a mark of interrogation.
Page 559, line 6 from the bottom, *for* L. prevostianus *read* U. prevostianus.
Page 591, line 3, *for* Lampsilis *read* Medionidus.
Page 648, *omit* 8th and 9th lines from the bottom.
Page 719, Unio striatulus Lea and U. amabilis Lea should be placed in the Argenteus group of Pleurobema.
Page 760, last line, *for* bigbyana *read* bigbyensis.
Page 766, line 6 from bottom, *for* multiplicata *read* heros.
Page 802, *omit* line 8.
Page 806, line 19, *for* æquitoria *read* æquatoria.
Page 823, lines 10 and 11, *for* æquitoria *read* æquatoria.
Page 825, *omit* lines 8 and 9.
Page 851, line 27, *for* incertus *read* murinus.
Page 862, *omit* line 31.
Page 894, *omit* line 28.
Page 906, 13th and following lines, *for* Chelidoneura *read* Chelidonura.
Page 933, *omit* lines 16 and 17.

THE OSTEOLOGICAL CHARACTERS OF THE FISHES OF THE SUBORDER PERCESOCES.

By EDWIN CHAPIN STARKS,

Assistant Professor in the Department of Biology and Curator of the Museum, University of Washington, Seattle, Washington.

A study of the skeletons of several representatives of the families Atherinidæ, Mugilidæ, and Sphyrænidæ, which are grouped together under the suborder Percesoces, reveals the fact that they are not so closely allied to each other as their external similarity would lead one to suppose.

The specimens from which my observations were made are adult examples of *Atherinopsis californiensis*, *Menidia notata*, *Mugil cephalus*, and *Sphyræna argentea*.

In examining the crania of these species attention is attracted at once to the fact that in all of them the epiotics are developed into long, thin processes which divide into more or less bristlelike filaments.

There is little else in purely internal characters whereby to differentiate these families as a group from other Acanthopteri. In order to so differentiate them we must turn to the well-known external characters—a spinous dorsal in conjunction with the abdominal ventral fins, high pectoral fins, and unarmed opercles.

If, however, we eliminate the Sphyrænidæ (which, on account of its fanglike teeth, set in deep sockets, its separate superior pharyngeals of third and fourth branchial arches, its lack of parapophyses on anterior vertebræ, and other characters, we may well be justified in doing) and place it in a separate superfamily coordinate with that in which we place the Mugilidæ and Atherinidæ, we shall then have remaining a more compact group, notwithstanding the great difference in number of vertebræ in the two families of which it is composed.

In it we find the parapophyses developed on all the abdominal vertebræ, the anterior neural spines flattened, wide and thin, the supraclavicle very small, the superior pharyngeals of each side of the third and fourth branchial arches anchylosed, and the teeth small, not fanglike and set in sockets.

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DIAGNOSIS OF THE SUBORDER PERCESOCES.

Two dorsal fins, the first spinous and more or less remote from the second; ventral fins abdominal, with 1 spine and 5 rays; third and fourth superior pharyngeals of each side separate or anchylosed; lower pharyngeals separate; pectorals elevated, nearly on a level with upper part of clavicle; epiotics of adult produced backward and more or less divided into bristlelike filaments; myodome present, opened or closed posteriorly; opercles unarmed; parietals separated by supraoccipital; supraoccipital crest developed posteriorly, not extending above level of balance of cranium; postclavicle of superior and inferior parts; anterior interhæmal not differentiated; epipleurals present; coronoid bone present;[1] suborbital ring without suborbital shelf.

DIAGNOSIS OF THE SUPERFAMILY ATHERINOIDEA.

Cleft of mouth not wide; teeth, when present, small, not set in sockets; maxillary without supplemental bone; third and fourth superior pharyngeals of each side anchylosed; supraclavicle reduced in size; lower limb of posttemporal attached to opisthotic by ligament or suture; exoccipitals not meeting above basioccipital; alisphenoids not meeting; ethmoid normal, not overlying prefrontals and vomer or extending to lateral edge of rostrum; anterior neural spines laterally flattened; parapophyses developed on all abdominal vertebræ.

DIAGNOSIS OF THE FAMILY ATHERINIDÆ.

Lower limb of post-temporal attached to opisthotic by ligament; basisphenoid developed; myodome opening to exterior posteriorly; region about foramen magnum not produced; superior pharyngeals typical in shape, bearing teeth; vertebræ numerous, from 45 to 52; first dorsal with from 3 to 8 spines; anal with 1 spine.

DIAGNOSIS OF THE FAMILY MUGILIDÆ.

Lower limb of post-temporal attached to cranium by dentate suture; basisphenoid absent; myodome not opening to exterior posteriorly; foramen magnum region produced; superior pharyngeals of complex shape, not bearing teeth; vertebræ few in number, about 24; first dorsal with about 4 spines; anal with 2 or 3 spines.

[1] This character seems to have been made too much of by the systematists and not enough of by the anatomists. Whether it is homologous with the coronoid as it occurs in some reptiles, or is one of the osteological peculiarities common to fishes, or whether it is developed with age, being the ossified end of the ligament that is attached to it, I will not attempt to say with the material at hand. The last supposition seems to be the least tenable, since the ossification is not a gradual transition from cartilage to bone, as we would expect in that case, but takes the form of a distinct bone larger than the end of the ligament. I find it present in nearly every species examined (my material being adult examples), among them the following miscellaneous genera: *Amiurus, Cyprinus, Lucius, Alosa, Holocentrus, Pomoxys, Lobotes, Roccus, Caranx, Archosargus, Neomænis, Tautoga, Pomatomus, Rachycentron, Scorpænichthys, Lopholatilus, Melanogrammus,* and *Gadus.*

DIAGNOSIS OF THE SUPERFAMILY SPHYRÆNOIDEA.

Cleft of mouth wide; teeth fanglike, some of them set in deep sockets, large teeth on palatines; maxillary with supplemental bone; third and fourth superior pharyngeals separate; supraclavicle not reduced in size; lower limb of post-temporal not attached to opisthotic by suture; exoccipitals not meeting above basioccipital; alisphenoids meeting; ethmoid a thin plate, entirely superior, extending to and forming edge of rostrum; anterior neural spines normal; parapophyses not developed on anterior vertebræ.

The characters of the family Sphyrænidæ are included in the foregoing diagnosis.

OSTEOLOGY OF ATHERINOPSIS CALIFORNIENSIS.

Exoccipitals not meeting above basioccipital, thus leaving the latter to form floor of foramen magnum.

Basioccipital and exoccipitals not much produced posteriorly.

Supraoccipital crest not projecting above superior level of skull; its posterior edge somewhat broken up and ragged.

Parietals widely separated by supraoccipital.

Epiotics produced backward, spreading out into thin, flat, horizontal processes, which are much divided and ragged, though scarcely "bristle-like," as in *Mugil* and *Sphyræna*.

Opisthotics with a projection to which lower limb of post-temporal is attached by ligament.

Pterotics extending back as thin horizontal shelves of bone.

Sphenotics well developed, their front edge continuous with edge of frontals.

Alisphenoids not meeting.

Anterior opening into brain case large.

Basisphenoid well developed, wholly in front of basis cranii and not continuous with it. Supported directly by prootics and slightly by alisphenoids. Its process strongly joined to parasphenoid, extending posteriorly into myodome.

Myodome large, opening to the exterior at its posterior end through a small foramen at end of parasphenoid.

Vomer convex on lower surface; its anterior edge produced at the middle; trilobate in the young and pierced by a network of holes.

Ethmoid wholly superior, being a simple, flat, thin bone supported at its anterior edge by vomer and sending some slender filaments of bone under frontals. The large space beneath it is filled by cartilage.

Frontals extending well back over about half of superior portion of supraoccipital.

Metapterygoid united to hyomandibular by a deeply dentate suture.

Pterygoid very much reduced in size—a mere splint of bone.

Bones of opercular apparatus large.

Opercular sending a spine forward in front of hyomandibular.

Dentary without the typical cavity into which the meckelian cartilage and end of articular runs anteriorly.

Angular present.

Coronoid bone present.

Post-temporal not especially firmly attached. Upper limb attached to base of epiotic process, the outer side rather loosely to pterotic process. The thin, flat lower limb attached to process from opisthotic by a short ligament.

Supraclavicle very short, its upper end scarcely reaching above upper end of clavicle.

Hypercoracoid placed high on clavicle. Its foramen as described under *Mugil*.

Hypercoracoid at upper end more broadly joined to clavicle than that of *Mugil*. Its lower end attached to a high median vertical wing between inner and outer edge of clavicle.

Actinosts very short, two joined to each the hypocoracoid and hypercoracoid. Two or three upper rays of pectoral fin working directly on hypercoracoid.

Postclavicle consisting of a superior and inferior part.

Pelvic bones higher than wide. A spinelike process sent upward from the outer edge of each of them.

Interneurals of spinous dorsal compressed into thin plates without descending spines between the neural spines. First and second interneurals not fused.

Interneurals of soft dorsal with spines between the neural spines as usual. In front of them an auxiliary interneural is attached.

Front of anal fin free under abdominal cavity.

Interhæmals subequal, growing slightly longer anteriorly. The first not differentiated.

Three basibranchials present, united to each other by sutures.

Suspensory pharyngeal[1] of first branchial arch present.

Second arch[2] with a small toothed superior pharyngeal.

Superior pharyngeals of third and fourth arches fused into a large elliptical bone. A transverse groove or suture is present, probably indicating separate pharyngeals of the third and fourth arches in the young.

Hyoid apparatus typical.

Branchiostegals six; all attached to outer surface of hyoid.

Nasals present; thin and short.

Suborbital ring apparently not complete, one bone besides preorbital being at anterior end and one at posterior, while directly beneath eye there are no bones in evidence.

Premaxillary wide at its lower end, while maxillary is subequal throughout its length, which is a transposition of the usual condition.

Maxillary without supplemental bone.

[1] Here so called because its function is usually that of suspending the branchial arches from the cranium. It is typically styloform and toothless.

[2] One side only of branchial arches considered in describing superior pharyngeals.

Vertebræ, in number, with hypural, 52. In another specimen, 50. Impossible to draw a line between abdominal and caudal vertebræ. Twenty-fifth and succeeding posterior vertebræ with an arch between each pair of parapophyses, behind which parapophyses gradually become longer, thinner, and wider, till at the thirty-fourth their tips approach each other and touch, forming a gradually decreasing tunnel continued to the forty-first, where it becomes obsolete. This tunnel is probably for reception of posterior end of air bladder. Only those vertebræ from the forty-first backward have typical hæmal spines.

Anterior neural spines, flattened into thin plates, much as in *Mugil*.

Parapophyses on all abdominal vertebræ, including atlas. Subequal in size and directed at about the same angle.

Superior anterior and posterior parapophyses normally developed; not with spines, as in *Mugil*.

Inferior posterior zygapophyses developed on a few of the middle vertebræ.

Hypural assisted in supporting caudal fin by spines of next preceding four or five vertebræ.

Ribs transversely flattened.

Epipleurals present, typical.

OSTEOLOGY OF MUGIL CEPHALUS.

Cranium short and broad, its upper surface smooth and convex.

Exoccipitals not meeting above basioccipitals, thus leaving the latter to form floor of foramen magnum.

Exoccipitals and basioccipitals produced backward, elongating the foramen magnum tunnel-like.

Supraoccipital crest produced backward, somewhat broken up or ragged posteriorly. Not extending above superior level of skull.

Parietals widely separated by supraoccipital.

Epiotics produced far backward, spreading out into thin, flat, horizontal processes which divide into bristlelike filaments.

Opisthotics sending back a rod of bone to which lower limb of posttemporal is united by suture.

Pterotics extending backward farther than usual as thin, flat projections.

Sphenotics well developed, forming large lateral projections from side of cranium. A short distance in front of them the frontals are laterally produced, leaving deep conspicuous notches over orbital region.

Alisphenoids not meeting.

Anterior opening into brain case large.

Basisphenoid absent.

Myodome present, not opening to exterior at its posterior end. The anterior edge of basis cranii some distance back from mouth of anterior opening into brain case.

Vomer divided anteriorly into two prominent horns by a deep rounded notch.

Ethmoid almost directly above vomer, similarly indented, but by a shallower notch.

Frontals not extending very far back, exposing underlying supraoccipital nearly to its anterior end, which reaches about middle of cranium.

Pterygoid reduced in size. Suspensorium otherwise typical.

Bones of opercular apparatus all large.

Opercular rolled over toward cranium at upper edge.

Cavity in dentary for reception of articular not large.

Coronoid bone well developed.

Angular present.

Dentary becoming slender anteriorly.

Post-temporal very firmly attached. Its upper fork attached broadly to a rough surface at base of epiotic process. Lower fork attached to process of opisthotic by very deeply dentate suture, forming an integral rod of nearly uniform size from opisthotic to distal end of posttemporal. Suture at about middle of rod. At posterior end of posttemporal at base of forks the long pterotic process is strongly fastened, thus forming a tripod attachment for shoulder girdle, making post-temporal wholly immovable.

Supraclavicle so small that it admits upper end of clavicle to nearly reach to a level with lower end of posttemporal.

Clavicle with a downward-hooked process on inner anterior edge.

Hypercoracoid placed high on clavicle. Its foramen, though wholly contained within hypercoracoid, is so near its forward edge that it deeply notches edge of overlying clavicle.

Hypocoracoid falciform. Its inner upper corner but slightly touching clavicle, thence curving quickly away and only weakly attaching to it at its long lower end.

Actinosts short; three joined to hypercoracoid, one to hypocoracoid.

Pectoral fin placed high on shoulder girdle, two or three of its upper rays working directly on hypercoracoid.

Postclavicle of two pieces. The superior typically lamellate, the inferior rodlike, large, and strongly curved inward.

From the under side of the pubic bones near their union each sends a long slender bone forward, which tapers to a hairlike process.

First interneural of spinous dorsal enlarged and divided into two spines, though supporting only one dorsal spine.

Interneurals of soft dorsal slender and subequal.

First interhæmal of anal enlarged very slightly, though not elongated, and supporting two anal spines. Interhæmals graduated from behind forward.

Front of anal not free under abdomen.

In front of spinous dorsal are two peculiar supernumerary interneurals composed of two long, slender, contiguous splints of bone placed horizontally. At the middle of each a fork is sent down between the second and third and fourth and fifth neural spines respectively.

Apparently but two basi branchials ossified; both in front of third arch, the hypobranchials of which meet on a median line.

Suspensory pharyngeal represented only by a nodule of cartilage.

First epibranchial typical. The three succeeding ones of complex shape, somewhat turned back upon themselves with many curves and processes.

To superior part of second epibranchial a rather thick triangular superior pharyngeal is attached.

Superior[1] to all else is a large pharyngobranchial of very complex shape. It is attached to and above the last three epibranchials and even to and above pharyngobranchial of second arch. It is doubtless the anchylosed pharyngobranchials of third and fourth arches. For ease of describing, it may be said to consist of a superior and an inferior part. The inferior, to which the epibranchials are attached, runs straight back to last arch. Springing from its anterior end a thin, imperforate, saucer-shaped superior bone arches widely over it, projecting both laterally and posteriorly. This upper part is further supported at its middle, umbrellalike, by a ray of bone sent up from posterior end of inferior part.

Hyoid apparatus typical in number and arrangement of elements.

Branchiostegals six, two attached to epihyal, four to ceratohyal; all attached to outer surface of hyoid.

Maxillary and premaxillary rather narrow and slight. Premaxillary widened at lower end, and without supplemental bone. Respective sides of maxillary rather widely separated by unusually wide processes of premaxillary sent backward at its symphysis.

Nasals short and quadrangular in shape.

Suborbitals forming a narrow ring, through which is the usual sensory canal.

Preorbital triangular, its lower edge sharply dentate.

Vertebral formula: Abdominal 11, caudal 12, which, with the hypural, number 24.

First five vertebræ with neural spines flattened laterally and forming a more or less continuous crest.

Parapophyses very large; wide and thin at the edges. Developed on all abdominal vertebræ, growing gradually larger and more nearly horizontal anteriorly, until the third is reached, thence scarcely diminishing in size to the atlas.

A process developed from each anterior zygapophysis, which is ankylosed with its fellow of the opposite side, forming an arch over neural cord, and extending obliquely forward to neural spine.

A spine developed from each posterior zygapophysis pointing obliquely backward and overlapping outer edge of that from anterior zygapophysis.

[1] The arches described as straightened out for examination, not as in natural position with the superior pharyngeals turned downward.

Inferior zygapophyses developed as large spines, each anterior spine the longer and pointing obliquely forward; each posterior pointing obliquely backward at right angles, meeting it at its middle.

Hypural assisted in supporting caudal fin by spines of two preceding vertebræ and two auxiliary spines substituting neural spine of first preceding vertebra.

First rib very small, placed on second vertebra. Second, two or three times as long and abruptly widened at its upper end. Others normal.

Four epipleurals only present. First placed on first vertebra, unaccompanied by a rib. Other three on first three ribs.

OSTEOLOGY OF SPHYRÆNA ARGENTEA.

Cranium elongate and narrow, forming a narrow isosceles triangle, as viewed from above.

Supraoccipital scarcely interposed between exoccipitals. Its crest extending far back as a thin plate of bone, dividing into numerous bristle-like filaments.

Exoccipitals meeting above basioccipital, completely surrounding foramen magnum.

Exoccipitals and basioccipital produced backward, elongating foramen magnum, which runs tunnel-like into brain cavity.

Parietals widely separated by supraoccipital, their posterior ends overlapping epiotics.

Epiotics extending backward in bristle-like filaments similar to supraoccipital.

Upper limb of posttemporal firmly attached to upper part of epiotic process rather than to main part of bone.

Opisthotics sending a spinelike process backward, to base of which lower limb of post-temporal rather loosely attaches itself by ligament.

Prootics produced anteriorly in a spinelike process.

Sphenotics large, separated from frontal at middle portion by a large foramen.

Alisphenoids meeting at their upper edges. They restrict the anterior opening into brain case to a comparatively small foramen.

Basisphenoid present, a foramen between it and basis cranii, its descending process reaching to and broadly attaching to parasphenoid.

Myodome present, not opening to exterior at posterior end.

Frontals elongate, covering two-thirds of length of skull.

Prefrontals very elongate, the olfactory foramen within their posterior fourth.

Ethmoid entirely superior in position, overlying anterior part of prefrontals and posterior part of vomer, forming edge of rostrum between prefrontals and vomer.

Nasals long, channeled rods of bone fully one third length of cranium firmly attached in a groove between frontals and prefrontals and continued along upper part of ethmoid and vomer.

Suborbital ring formed of a very large preorbital and the usual chain of small suborbitals tunneled with sensory canal.

Bones of suspensorium and opercular apparatus typical in their relative positions.

Palatine process very strong and heavy, its lower edge sharp, supporting a single row of teeth.

Metapterygoid rather thick, united by suture for whole length of its attachment with hyomandibular. No foramen between.

Symplectic attached to metapterygoid at its upper end by subdentate suture.

Angular present, rather small.

Coronoid bone well developed.

Maxillary and premaxillary so attached to each other as to allow little play between them. Maxillary with a well developed supplemental bone which bears a knob on its posterior edge.

Teeth of palatine and jaws, except anterior teeth of lower jaw and premaxillary, set deep in grooves, which are subdivided for each tooth forming semisockets.[1] The exceptions noted isolated and set in true sockets. The rooted portion of each tooth as great or greater than the exposed portion.

Clavicle turning forward at an angle slightly above pectoral fin.

Pectoral superior in position, its upper ray working directly upon hypercoracoid.

Actinosts moderate in size, all attached to hypercoracoid except half of lower one.

Hypercoracoid barely touching clavicle at its upper end, arching widely away from it and strongly attaching to it at its lower end. At its upper superior portion a process projects backward past end of actinosts.

Postclavicle consisting of two parts.

Supraclavicle of moderate size.

Hypohyals united to ceratohyals by sutures.

Glossohyal rod-like, rather stout and elongate.

Urohyal divided into three long processes extending backward beyond posterior ends of branchiostegals. These subdivided into bristle-like filaments.

Branchiostegals seven in number.

Basibranchials three in number, the anterior one in front of that of first arch, the posterior ones supporting both second and third arches.

Superior pharyngeals four, including the moderate suspensory pharyngeal, the two posterior forming an elongate ovate patch, but not anchylosed.

First two interneurals of spinous dorsal not anchylosed, as is commonly the case.

[1] Somewhat similar to the posterior teeth in the jaws of a crocodile.

Interhæmals evenly graduated in length from behind forward, the anterior one not differentiated.

Vertebral formula: Abdominal, 13; caudal, 11, which, with the hypural, are 24.

Atlas short, the succeeding vertebræ elongate and rather smooth, without deep pits, and much constricted in the middle.

Anterior and posterior zygapophyses well developed.

Parapophyses not developed anterior to ninth vertebra.

Evidence apparent of hypural having been developed from two posterior vertebræ.

Hypural assisted in bearing caudal fin by spines from two preceding vertebræ and some detached auxiliary spines taking the place of neural spine of first preceding vertebra.

Lateral processes from hypural large and flat, forming a keel.

Last pair of ribs firmly anchylosed with last pair of parapophyses.

Epipleurals present.

EXPLANATION OF PLATES.

SIGNIFICANCE OF REFERENCE LETTERS USED ON PLATES.

[From drawings by Chloe Lesley Starks.]

als.	Alisphenoid.	*pas.*	Parasphenoid.
bo.	Basioccipital.	*p.*	Parietal.
bs.	Basisphenoid.	*pro.*	Prootic.
epo.	Epiotic.	*pto.*	Pterotic.
e.	Ethmoid.	*pf.*	Prefrontal.
eo.	Exoccipital.	*spo.*	Sphenotic.
fr.	Frontal.	*so.*	Supraoccipital.
na.	Nasal.	*v.*	Vomer.
opo.	Opisthotic.		

PLATE I.

Superior views of the crania of *Sphyræna argentea*, *Atherinopsis californiensis*, and *Mugil cephalus*.

PLATE II.

Lateral views of the crania of *Sphyræna argentea*, *Atherinopsis californiensis*, and *Mugil cephalus*.

PLATE III.

Posterior views of the crania of *Sphyræna argentea*, *Atherinopsis californiensis*, and *Mugil cephalus*.

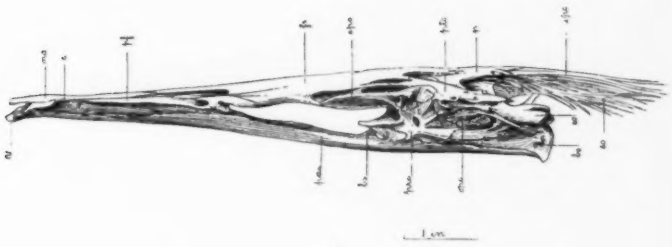
1

2

3

SUPERIOR VIEWS OF CRANIA OF (1) SPHYRÆNA ARGENTEA, (2) ATHERINOPSIS CALIFORNIENSIS, AND (3) MUGIL CEPHALUS.

FOR EXPLANATION OF PLATE SEE PAGE 10.



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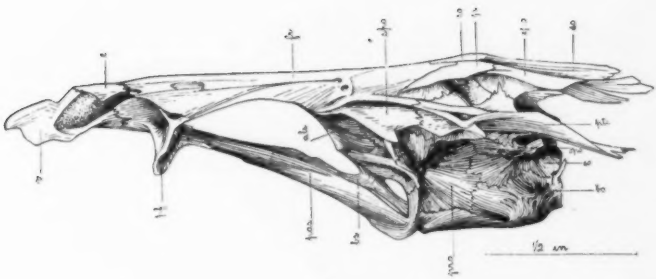

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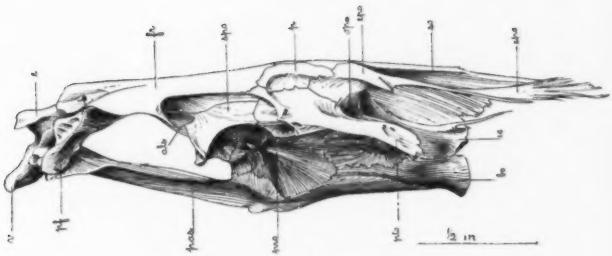

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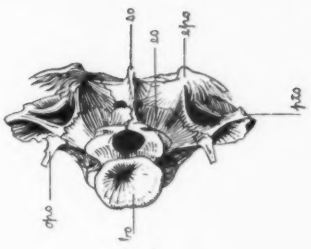
LATERAL VIEWS OF CRANIA OF (1) SPHYRÆNA ARGENTEA, (2) ATHERINOPSIS CALIFORNIENSIS, AND (3) MUGIL CEPHALUS.

FOR EXPLANATION OF PLATE SEE PAGE 10.



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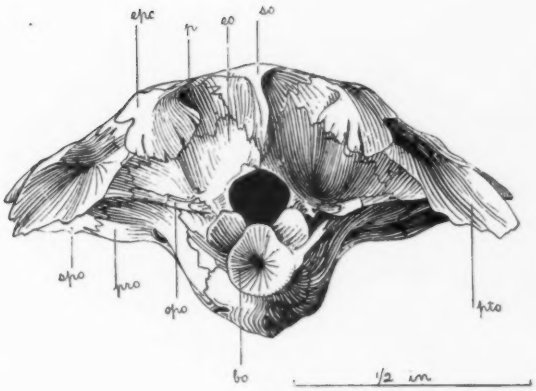

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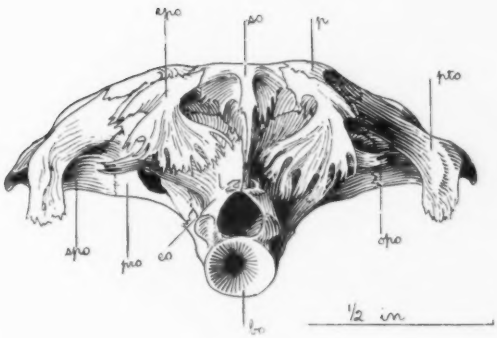


3

POSTERIOR VIEWS OF CRANIA OF (1) SPHYRÆNA ARGENTEA, (2) ATHERINOPSIS CALIFORNIENSIS, AND (3) MUGIL CEPHALUS.

FOR EXPLANATION OF PLATE SEE PAGE 10.

NOTES ON BIRDS FROM THE CAMEROONS DISTRICT, WEST AFRICA.

By HARRY C. OBERHOLSER,

Assistant Biologist, Department of Agriculture.

The U. S. National Museum has recently acquired a small collection of birds made by Mr. G. L. Bates in the Cameroons District of West Africa. At the request of the curator of the Division of Birds the writer has prepared the following report upon this collection which, though it contains no novelties, comprises several species of considerable interest; and the data from the labels has been supplemented by such critical remarks upon the specimens as the circumstances appear to make desirable, including the creation of a new genus for the reception of the species commonly known as *Andropadus virens*.

The 59 specimens are referable to 32 species, and are nearly all from Efulen—or Ebfulla, as it is called on German maps—in the Njondo River region, about 100 miles inland. Only two specimens, one each of *Ceratogymna atrata* and *Actitis hypoleuca*, are from elsewhere, they coming from Batanga on the coast. The dates of collecting range from May 30 to August 3, but a large proportion of the specimens were taken in June.

Family SCOLOPACIDÆ.

ACTITIS HYPOLEUCA (Linnæus).

Tringa hypoleucos LINNÆUS, Syst. Nat., 10th ed., I, 1758, p. 149.
Actitis hypoleucos ILLIGER, Prodr., 1811, p. 262.

One specimen in worn plumage, taken at Batanga, August 3, 1895.

Family TRERONIDÆ.

VINAGO CALVA (Temminck and Knip).

Columba calva TEMMINCK and KNIP, Pig., I, 1808, p. 35, pl. 7.
Vinago calva STEPHENS, Gen. Zool., XI, Pt. 1, 1819, p. 117.

One male, undoubtedly adult, although the gray collar on the hind neck is rather indistinct, being strongly tinged with the olive green of the upper surface.

Family ALCEDINIDÆ.

HALCYON MALIMBICUS (Shaw).

Alcedo malimbica SHAW, Gen. Zool., VIII, 1811, p. 66.
Halcyon malimbica CASSIN, Cat. Halcyon. Phila. Mus., 1852, p. 8.

One adult male. Although Dr. Reichenow does not include[1] this form among the birds of the Cameroons District, there seems to be little doubt of the correct identification of the present specimen, as it agrees perfectly with the plate and description given by Dr. Sharpe.[2] The present locality must be quite or at least very near the northern limit of the range of *malimbicus*, which probably passes thence into *Halcyon malimbicus forbesi*, the latter occupying the region from at least the Cameroons Mountains northward to Sierra Leone, and in turn replaced in Senegambia by *Halcyon malimbicus torquatus*.

HALCYON SENEGALENSIS (Linnæus).

Alcedo senegalensis LINNÆUS, Syst. Nat., 12th ed., I, 1766, p. 180.
Halcyon senegalensis SWAINSON, Birds W. Afr., II, 1837, p. 97.

Two specimens, one of which, though nearly adult, still retains some indications of immature plumage. The maxilla is red, save for a dusky spot on each side at the base and a narrow blackish line along the apical two-thirds of the culmen. The flanks are distinctly barred with dusky; the sides of the head, including the superciliary region, together with the nape and occiput, have a conspicuous wash of bluish, and the whole upper surface, particularly the anterior portion, is darker and duller than in the fully adult.

Family BUCEROTIDÆ.

LOPHOCEROS FASCIATUS (Shaw).

Buceros fasciatus SHAW, Gen. Zool., VIII, 1811, p. 34.
Lophoceros fasciatus CABANIS and HEINE, Mus. Hein., II, 1860, p. 168.

A pair of adult birds is in the collection. The greater size of the male is very conspicuous in the bill.

CERATOGYMNA ATRATA (Temminck).

Buceros atratus TEMMINCK, Pl. Col., II, 1834, p. 69, pl. 558.
Ceratogymna atrata SHELLEY, Ibis, 1888, p. 51.

One specimen, a fine adult male, with molt not quite completed. This bird was shot in the forest 10 miles east of Batanga.

[1] Journ. für Ornith., 1896, p. 55.
[2] Cat. Birds Brit. Mus., XVII, 1892, p. 247, pl. 6, fig. 3.

Family CAPITONIDÆ.

GYMNOBUCCO CALVUS (Lafresnaye).

Bucco calvus LAFRESNAYE, Rev. Zool., 1841, p. 241.
Gymnobucco calvus BONAPARTE, Consp. Avium, I, 1850, p. 141.

Two specimens, male and female, June 11, 1895. Both of these individuals are typical of the so-called *Gymnobucco peli*, and are undoubtedly adults. From examination of these and from comparison with an adult specimen of true *G. calvus* from Fantee, the writer is very strongly inclined to consider Dr. Sharpe correct in his opinion of the specific distinctness of *G. peli*. That they are sexes of the same species seems unlikely if any reliance is to be placed upon the sexing of collectors. The examples at hand indicate that *calvus* is in all its dimensions a decidedly larger bird than *peli*, this difference of dimensions conspicuous in the bill. It lacks entirely the tufts of nasal bristles so conspicuous in *peli*, and the scattered bristles on the top of the head are much fewer in number. The number of specimens at present available is too limited, however, to warrant a definite opinion, and final disposition of the question must necessarily be deferred until a sufficient series properly sexed can be brought together.

TRICHOLÆMA GABONENSE Shelley.

Tricholæma gabonense SHELLEY, Bull. Brit. Orn. Club, XXIX. October, 1895, p. iii.

An adult female of this little known but very distinct species is contained in the present collection. As no detailed description of the species appears to have been published, the following, taken from this example, is added:

Top of head black, thickly spotted with greenish yellow; remainder of upper parts, including wings and tail, sepia brown; the back and wing-coverts with roundish markings of greenish yellow; wing-quills (excepting outer primaries), tail-feathers, and upper tail-coverts margined externally with greenish yellow, this most golden on the wings, most greenish on the tail-coverts; sides of head black mottled with white; throat white, the feathers with shaft markings of brownish black; rest of lower parts dull yellowish green, the feathers of the jugulum with narrow black shaft lines and hair-like tips; the breast and abdomen with roundish spots of dark brown, these expanding into bars posteriorly.

Family PICIDÆ.

MESOPICOS XANTHOLOPHUS Hargitt.

Dendropicus xantholophus HARGITT, Ibis, 1883, p. 173.
Mesopicus xantholophus HARGITT, Ibis, 1883, p. 421.

One specimen of this rare species is contained in the collection. Although sexed as a female, the yellow feathers on the occiput seem to indicate its being a male. Otherwise it is apparently typical, though its measurements are rather small.

DENDROMUS PERMISTUS (Reichenow).

Picus (Campothera) permistus REICHENOW, Journ. für Orn., 1876, p. 97.
Campethera permista SHARPE and BUVIER, Bull. Soc. Zool. France, 1876, p. 312.

The single example is an adult male. It differs from an Angola female in the U. S. National Museum by reason of its brighter green upper surface and deeper color below—the latter particularly noticeable posteriorly—and by its somewhat smaller size. Should a satisfactory series prove these differences to be sufficiently constant, the Cameroons form, provisionally established on smaller size by Dr. Sjostedt,[1] must be known as *Dendromus permistus pumilus.*

The generic term *Dendromus* Swainson, 1837, antedates by several years *Campethera* Gray, 1841, and should be used for the group which in current usage passes under the name *Campothera.* There is no more reason for rejecting *Dendromus* on the ground of a former *Dendromys*[2] than there would be to refuse *Pica* on account of a previous *Picus*, for *Dendromus* is derived from δένδρον and δρόμος, while *Dendromys* comes from δένδρον and μῦς, the terminal elements involving more than mere grammatical endings, although as latinized they differ only in a single letter.

Family TROGONIDÆ.

APALODERMA NARINA (Levaillant).

Couroucou narina LEVAILLANT, Ois. d'Afr., V, 1806, p. 73.
Apaloderma narina SWAINSON, Classif. Birds, II, 1837, p. 337.

The single specimen is an immature male, and differs from all the other examples of this form with which it has been compared in the color of the upper surface, which is clear grass-green, with scarcely a trace of the bronzy tinge so evident in ordinary specimens. Otherwise it is apparently typical, the wing-coverts being broadly edged with green, thus showing no approach to *constantia.*

Family PYCNONOTIDÆ.[3]

BLEDA[4] ICTERINA (Bonaparte).

Trichophorus icterinus BONAPARTE, Consp. Avium, I, 1850, p. 262 (ex Temminck, manuscript).

One adult male, in breeding plumage. This species is commonly placed in the genus *Criniger*, and by Captain Shelley[5] in *Pyrrhurus*, but in pattern of coloration, as well as in structural characters, it is so

[1] Ornith. Monatsberichte, II, 1894, p. 35.
[2] Smith, Zool. Journ., IV, 1829, p. 439.
[3] Brachypodidæ is certainly untenable as a family name for this group if the genus *Brachypodius*, upon which it is founded, be considered a synonym of *Microtarsus.* Even if *Brachypodius* is distinct, the proper designation for the family is apparently Pycnonotidæ, since it seems to have been the name first used.
[4] For the use of this name, see Richmond, Auk., XVI, April, 1899, p. 183.
[5] Birds of Africa, I, 1896, p. 64.

perfect a miniature of *Xenocichla* (= *Bleda*) *syndactyla* that Cassin apparently was quite right in calling it a *Xenocichla* (= *Bleda*). With regard to the specific name, however, it seems to the present writer unnecessary to reject *icterina* of Bonaparte for *tricolor* of Cassin solely on account of a previous *icterica* in the same genus; for the two names are sufficiently distinct, both actually and etymologically, not to cause any serious confusion.

EURILLAS,[1] new genus.

Chars. gen.—Genus generi "Andropadus" dicto simile, a quo differt rostro latiore et depressiore, naribus rotundatis.

Type.—*Andropadus virens* Cassin.

The type of the genus *Andropadus* is *A. importunus* (Vieillot), from which *A. virens* differs so much in structural characters that its generic separation seems necessary. The very much broader, more depressed bill, oval instead of slit-like nostrils, are very distinctive. The tomia are scarcely or not at all incurved, and the closed bill is thus without the groove which is so conspicuous along the commissure of *Andropadus importunus*. The outline of the culmen is nearly straight until near the tip, while in *Andropadus* it is curved almost from the base. The rictal bristles are also more strongly developed in *Eurillas*. From other related genera, except *Stelgidillas*,[2] *Eurillas* may easily be distinguished by the serrations of the subterminal portion of the cutting edge of the maxilla, and from *Stelgidillas* by the short, broad, and much-depressed bill.

Of the other species commonly referred to *Andropadus*, only *latirostris* has been examined, so that with this exception it has not been possible to determine where they should be placed.

EURILLAS VIRENS (Cassin).

Andropadus virens CASSIN, Proc. Acad. Nat. Sci. Phila., 1857, p. 34.

Two specimens. Although both are apparently adults, one is much more brownish both above and below.

EURILLAS LATIROSTRIS (Strickland).

Andropadus latirostris STRICKLAND, Proc. Zool. Soc., 1844, p. 100.

One specimen. There may be some doubt about the advisability of referring this species to *Eurillas*, for in some characters it is aberrant; but it certainly is not an *Andropadus*, and, unless a separate genus be created for its reception, is apparently best placed as above.

PYCNONOTUS BARBATUS GABONENSIS (Sharpe).

Pycnonotus gabonensis SHARPE, Proc. Zool. Soc., 1871, p. 132, pl. VII, fig. 1.

Three specimens, practically identical in plumage, except that one has almost no tinge of yellow on the crissum. The much darker shade of all brown portions of the plumage easily distinguishes this form from

[1] *Εὐρύς*, latus; *ἶλλάς*, turdus. [2] Proc. U. S. Nat. Mus., XXII, 1899, p. 130.

true *barbatus;* but intermediate specimens, from the region of the river Niger,[1] make necessary its reduction to subspecific rank. An example in the U. S. National Museum collection, from Fantee, is intermediate, but apparently nearer *gabonensis.*

Family MUSCICAPIDÆ.

STIZORHINA FRASERI (Strickland).

Muscicapa fraseri STRICKLAND, Proc. Zool. Soc., 1844, p. 101.
Stizorhina fraseri OBERHOLSER, Proc. Acad. Nat. Sci. Phila., June, 1899, p. 213.

Two specimens. Both are sexed as males, but one is noticeably paler both above and below, having also much less rusty on the superior wing-coverts, is slightly smaller, and may possibly be a female.

TCHITREA VIRIDIS (Müller).

Muscicapa viridis MÜLLER, Syst. Nat., Anhang, 1776, p. 171.
Muscicapa cristata GMELIN, Syst. Nat., I, 1788, p. 938.

One specimen of this puzzling species is in the collection. The head is metallic greenish blue, as is also the throat, which shades off gradually into the bluish slate of the abdomen and crissum; the back and well-developed tail are rufous.

This is the species commonly called *Terpsiphone cristata*, but Müller's name *viridis* has twelve years' priority, and should not be ignored.

ARTOMYIAS FULIGINOSA J. and E. Verreaux.

Artomyias fuliginosa J. and E. VERREAUX, Journ. f. Orn., March, 1855, p. 104.

One specimen, in rather poor plumage, taken June 8, 1895. It is marked female.

DIAPHOROPHYIA CASTANEA (Fraser).

Platysteira castanea FRASER, Proc. Zool. Soc., 1842, p. 141.
Diaphorophyia castanea SHARPE, Ibis, 1873, p. 172.

Three specimens. Two are adult males in breeding plumage; the other is apparently a young female. It differs from the adult female in being rather darker above, the head dull grayish brown instead of bluish gray; the burnt-sienna brown of throat and jugulum much mixed with whitish.

Family NECTARINIIDÆ.

ANTHREPTES FRASERI Jardine and Selby.

Anthreptes fraseri JARDINE and SELBY, Ill. Orn., 1842, new ser., pl. 52.

One specimen, apparently an adult female, taken June 15, 1895. This rare sunbird does not seem ever to have been recorded north of Gaboon, and thus is a very interesting addition to the fauna of the Cameroons District.

[1] Sharpe, Cat. Birds Brit. Mus., VI, 1881, p. 147.

CINNYRIS OBSCURA (Jardine).

Nectarinia obscura JARDINE, Monogr. Sunbirds, 1842, p. 253.
Cinnyris obscurus BONAPARTE, Consp. Avium, I, 1850, p. 407.

In the series of seven specimens there is comparatively little individual color difference. The upper parts in some are rather more tinged with brownish; the under surface varies somewhat in the extent and shade of the greenish wash; but otherwise they are alike. There is, however, a considerable variation in measurements. A specimen in the U. S. Museum collection, from Fantee, is noticeably more brownish both above and below, and suggests the possibility of the existence of a northern race.

Family PLOCEIDÆ.

MALIMBUS MALIMBICUS (Daudin).

Tanagra malimbica (male) DAUDIN, Ann. du Mus., I, 1802, p. 151, pl. 10, fig. 1.
Malimbus malimbicus SHARPE, Cat. Birds Brit. Mus., XIII, 1890, p. 480.

The single specimen is an adult male in perfect plumage. It is apparently identical with an example from Fantee, and as compared with this does not exhibit the restriction of black on the forehead which is stated by Dr. Sharpe to characterize the Cameroons birds.

SPORAEGINTHUS MELPODUS (Vieillot).

Fringilla melpoda VIEILLOT, Nouv. Dict. d'Hist. Nat., XII, 1817, p. 177.
Sporaeginthus melpodus SHARPE, Cat. Birds Brit. Mus., XIII, 1890, p. 325.

Two specimens, June 26, 1895, in immature plumage. As this condition differs somewhat from that of the adult, and appears to be unknown, the following description is offered: Above, including wing-coverts, light chocolate brown, duller and rather darker on the head, but without conspicuous contrast; upper tail-coverts dull red; wing-quills fuscous, narrowly margined with paler; tail sepia, the outer feathers tipped and broadly edged externally with brownish gray; sides of head orange, this color deepest on the lores and paling to yellow on the posterior auriculars; throat and sides of neck light gray; remainder of lower parts dull buff, palest anteriorly; lining of wing buff.

PYRENESTES COCCINEUS Cassin.

Pyrenestes coccineus CASSIN, Proc. Acad. Nat. Sci. Phila., 1848, p. 67.

Two adult males in the comparatively rare black plumage. One of these, taken June 27, is in process of molt, this being most conspicuous in the feathers of head and tail.

Family HIRUNDINIDÆ.

PSALIDOPROCNE NITENS (Cassin).

Atticora nitens CASSIN, Proc. Acad. Nat. Sci. Phila., 1857, p. 38.
Psalidoprocne nitens SHARPE, Proc. Zool. Soc., 1870, p. 291.

Two specimens. Both have the throat sooty brown, a character mentioned by Dr. Sharpe[1] as peculiar to the birds from Gaboon and

[1] Cat. Birds Brit. Mus., X, 1885, p. 204.

the Cameroons. No other specimens are at present available for comparison, so that it is impossible to add anything to his remarks. One of the present examples, probably an immature bird, has a conspicuous brownish tinge to the entire plumage, this most noticeable below, the abdomen being almost entirely devoid of any greenish shade.

Family DICRURIDÆ.

DICRURUS MODESTUS Hartlaub.

Dicrurus modestus HARTLAUB, Rev. et Mag. de Zool., 1849, p. 495.

One adult male, June 5, 1895. In process of molt, this particularly observable in the feathers of the wings, tail, throat, and sides of head. This example is slightly less velvety above than others of the same species, in this respect appearing to be somewhat intermediate between true *modestus* of Gaboon and *atactus*[1] from Liberia and Fantee.

Family LANIIDÆ.

NICATOR CHLORIS (Lesson).

Tchagra chloris LESSON, Traité d'Orn., 1831, p. 373.
Nicator chloris FINSCH AND HARTLAUB, Vög. Ostafr., 1870, p. 360.

One specimen, apparently identical with others from Fantee and Gaboon

CHAUNONOTUS SABINEI Gray.

Thamnophilus sabinei J. E. GRAY, Zool. Misc., I, p. 6.
Chaunonotus sabinei J. E. GRAY, Mag. Nat. Hist., IX, 1837, p. 487.

One specimen, July 15, 1895, with molt not quite completed. The structural characters of this species seem quite sufficient to warrant its generic separation from *Dryoscopus*.

DRYOSCOPUS LEUCORHYNCHUS Hartlaub.

Telephonus leucorhynchus HARTLAUB, Rev. Zool., 1848, p. 108.
Dryoscopus leucorhynchus HARTLAUB, Orn. W. Afr., 1857, p. 112.

One specimen, differing from a Gaboon example in having less of the brownish tinge, this appreciable throughout the plumage, and in having a shorter tail; but whether these differences are geographical or merely individual is not possible to determine from the material at hand.

TELOPHONUS AUSTRALIS USSHERI (Sharpe).

Laniarius ussheri SHARPE, Layard's Birds S. Africa, 1882, p. 397.
Telophonus ussheri GADOW, Cat. Birds Brit. Mus., VIII, 1883, p. 124.

One male, June 14. The specific distinctness of *Telophonus australis* from *Telophonus senegalus* appears to be perfectly well established on the differences mentioned by Dr. Gadow;[2] and the latter is also darker,

[1] Proc. U. S. Nat. Mus., XXII, 1899, p. 35.
[2] Cat. Birds Brit. Mus., VIII, 1883, p. 124.

duller below, with a much more deeply ochraceous superciliary stripe. *Telophonus australis ussheri* seems to be a very good race, and some additional characters separating it from true *australis* are the darker shade of the upper surface, the rather lighter, less ochraceous superciliary stripe, and much paler auriculars. In the present specimen of *ussheri* the dark bars on the two middle tail feathers are much more indistinct than on any of the examples of *australis* available for comparison.

The specific name *australis* appears to be the correct one for the bird commonly known as *Telophonus trivirgatus*, since *Malaconotus australis* Smith[1] has thirteen years priority over the same author's *trivirgatus*.

Family ORIOLIDÆ.

ORIOLUS NIGRIPENNIS Verreaux.

Oriolus nigripennis VERREAUX, Journ. f. Orn., 1855, p. 105.

Two specimens in adult plumage. This species is, besides its other points of difference, very much more yellowish green above than either *Oriolus larvatus* or *Oriolus larvatus brachyrhynchus*.

Family PRIONOPIDÆ.

FRASERIA OCHREATA (Strickland).

Tephrodornis ochreatus STRICKLAND, Proc. Zool. Soc., 1844, p. 102.
Fraseria ochreata HARTLAUB, Orn. West Afr., 1857, p. 102.

Five specimens, two adults and three more or less immature. The former are sexed as males, and are apparently typical. One of them has a broad white tip to one of the right scapulars—evidently an albinistic marking. The immature birds differ in being rather lighter and browner above, with narrow fulvous tips to the greater wing-coverts, and in being washed with ochraceous below, most conspicuously on the breast and jugulum, though in one example quite strongly over nearly all the lower surface. The squamations on the chest are much less distinct than in the adult, being rather narrower, as well as paler and more brownish.

Whether or not *Fraseria* should be included among the Prionopidæ may well be questioned, but its scutellated tarsus indicates that it is not a thrush, although it has been placed in the family Turdidæ by Captain Shelley.[2]

[1] Rep. Expl. Exped. Cent. Afr., 1836, p. 44. [2] Birds of Africa, I, 1896, p. 83

DESCRIPTIONS OF TWO NEW SPECIES OF TORTOISES FROM THE TERTIARY OF THE UNITED STATES.

By O. P. Hay.

The species first to be described was collected by Mr. Charles Schuchert, assistant curator, division of stratigraphic paleontology, U. S. National Museum. The specimen was found in the Zeuglodon beds of the Jackson formation of the Eocene, in Choctaw County, Alabama, near Cocoa post-office, on land belonging to Mr. James Brown. In the immediate vicinity, Mr. Schuchert collected also a nearly complete skeleton of *Basilosaurus* (*Zeuglodon*), some bones of *Dorudon*, and vertebræ of the snake which has been described and figured by Mr. F. A. Lucas[1] as *Pterosphenus schucherti*.

The turtle was found lying imbedded in the rock with the plastron downward. The upper portion of the carapace had been planed off by denudation down to the upper borders of the marginals. It is therefore impossible to determine the character of the neural and costal bones and of the various superior epidermal scutes. The remainder of the shell was intact, or nearly so, when excavated; but, in spite of careful packing, it suffered much in shipment to the National Museum. However, notwithstanding its broken condition, it has, under the intelligent supervision of Mr. Lucas, the Curator of the Division of Comparative Anatomy, been so skillfully restored that little is left to be desired, so far as the plastron and most of the marginals are concerned. To Mr. Lucas I am indebted for the opportunity to study and describe this interesting relic.

I have assigned this species provisionally to the genus *Hadrianus* of Cope. It undoubtedly belongs there, or to *Testudo*, or to some closely related genus. In order to determine this question definitely we need to have the upper portion of the shell. An examination of the diagram of the shell of *Testudo ibera* given by Boulenger[2] shows that the neurals and costals of this genus have undergone peculiar modifications. The neurals are alternately quadrate and octagonal, while the outer ends

[1] Proc. U. S. Nat. Mus., 1898, XXI, p. 637.

[2] Catalogue of Chelonians, p. 151.

of the costals are alternately very wide and very narrow. In *Hadrianus* the elements of the carapace have not attained such differentiation.

The species here described is named in honor of its discoverer. It will therefore be known as

HADRIANUS SCHUCHERTI.

The total length of the shell of this tortoise was originally close to 75 cm. (30 inches); its width, 52.5 cm. (21 inches). As will be seen from an inspection of Plate IV, the lateral borders of the shell are nearly straight, and parallel with each other. In front of the forelegs the margins round rapidly into the anterior border, so that in front the carapace is quite truncate. The hinder border approaches a segment of a circle. Neither the anterior nor the posterior margin is to any degree serrated.

The marginals rise on the side of the carapace to a height of 10 cm. The passage from the lower surface of the shell to the upper is quite abrupt; but this is due to a considerable extent, at least, to distortion from pressure. In living forms of *Testudo* the upper portion of the shell usually rounds gradually into the lower portion.

The borders of the carapace over the openings for the posterior limbs are gently reverted; over the openings for the lower limbs the carapace is somewhat more strongly reverted. The caudal marginal appears to have descended without any upward flare.

The plastron is concave; it has a length of 67.5 cm. On a line 25 mm. in front of the axillary notch the width of the anterior lobe of the plastron is 28 cm. The tip of the lobe is prolonged into an obtuse angle. The tip is considerably thickened in front, but the borders are rather acute. The tip of the lobe was not prolonged in front of the carapace. In *Hadrianus octonarius*, the type of the genus, the plastron ends in front in a very broad and truncate lip.

The width of the bridge is slightly more than one-third the length of the plastron. Measured on a line 25 mm. behind the inguinal notches, the width of the hinder lobe of the plastron is 30 cm. This lobe is deeply notched on its hinder border. The posterior angles may, however, have been somewhat more rounded than in the restoration.

The entoplastron has a width of 15 cm. Its hinder border can not be accurately traced, but its position was not greatly different from that represented by the dotted line on Plate V. The other bony elements of the plastron have their boundaries shown on the same plate by means of the continuous zigzag lines. They present no essential variations in form or position from those of modern species of *Testudo*.

The conformation of the epidermal scutes, whose sutures are shown by the stippled lines in Plate V, is not, so far as can be determined with certainty, essentially different from that of the shields of recent species of *Testudo*. The gulars did not encroach on the territory of the entoplastron. The humero-pectoral suture runs straight across the plastron until it approaches the axillary notch, when it turns abruptly forward.

The pectoral shields are extremely narrow in the middle line, but they widen right and left. The suture between the right and the left abdominal shields is very long, being contained in the length of the plastron only two and one-half times. There is present on each side an evident inguinal shield, and there were probably axillary shields, but they can not be demonstrated. I am not able to determine with certainty the position of the suture between the marginal shields and those of the plastron. In *Testudo* and its immediate allies this suture is well up on the marginal bones. In other genera, as *Geomyda* and *Clemmys*, it is located near the outer border of the plastral bones. In *H. schuchertí* the suture between the pectorals and the abdominals gives off, near the outer border of the hyoplastron, what seems plainly to be a branch which is directed forward. This branch seems to me to be the anterior end of the suture between the plastral and the marginal shields. If such it is, it is quite different in position from that of species of *Testudo*. In the type of *Hadrianus*, a large and quite perfect shell, the sutures between the epidermal shields are very deep and distinct, but the sutures between the bones are usually very obscure. Nevertheless, I believe that here too the epidermal suture referred to lies on the plastral bones.

The second species of turtle to be described comes from coal-bearing strata of Miocene age. The particular locality is mine No. 4, near Roslyn, Washington. This town is located in Kittitass County, at the eastern base of the Cascade range of mountains. The deposit in which the turtle was found is known as the Roslyn sandstone. The preservation of the fine specimen is due to the intelligent interest of Mr. P. Y. Heckman, of Roslyn, from whom it was obtained for the U. S. National Museum. The Museum is indebted to Dr. F. H. Knowlton for his friendly offices in securing this species.

The specimen displays only the upper surface of the shell; but this is almost entire and almost uninjured. It is probable that the plastron is also present, but the matrix is so refractory that it has been thought best not to attempt to remove it. After a careful study of the carapace I have been unable to assign it to any of the described genera of Testudines. I therefore venture to propose a new genus for its reception. The specific name I derive from the collector of the specimen. The name of this new form is

ACHERONTEMYS HECKMANI.

Generic characters.—Carapace broad, rather depressed. Neural bones about as broad as long; mostly hexagonal, with the antero-lateral sides much shorter than the postero-lateral. A single very broad pygal. Marginals 23 in number, coinciding with the outer ends of the costals, instead of alternating with them. Vertebral shields very broad.

Name derived from *Acheron*, a river of the fabled lower world, and *emys*, a turtle.

Specific characters.—Carapace broad, rounded in front and behind.

No evidences of serrations on the border behind. Median line apparently occupied by a keel of low bosses.

Surface of the carapace mostly smooth, with the impressions of the shield sutures distinct; areas occupied by costal shields with some longitudinal wrinkles. First neural nearly square; the eighth pentagonal, with the anterior side very short. The single pygal extremely broad, extending across three marginals. The nuchal is considerably broader than long. Marginals quadrate; the lateral ones each placed opposite the end of a costal. The second and third vertebral shields enormous, extending laterally beyond the middle of the costals, the anterior border of the second vertebral occupying its usual position. Its hinder border thrown back to the hinder border of the third neural. The hinder border of the third vertebral not crossing the fifth neural, the usual position, but thrown backward to near the hinder border of the sixth neural. The fourth neural is thus made very concave in front. Costal shields narrow, not one-half as wide as the contiguous vertebrals, alternate sutures between lateral marginal shields coinciding with sutures of costal shields.

As to the relationships of this genus we can say nothing certain until we have at least had an opportunity to study the plastron. Nevertheless its affinities appear to be with the Chelydridæ, and we may place it there provisionally. It is of interest to compare the figure on Plate VI with the diagrams of the carapaces of *Chelydra* and *Macroclemmys*, found in Boulenger's Catalogue of Chelonians.[1] The carapaces of all three genera have the same general form; in all, the neural bones are closely similar; in all, the marginals lie opposite the outer ends of the costals, instead of alternating with the latter. In *Chelydra* and *Macroclemmys*, however, there are more or less extensive fontanelles between the costals and marginals. In both, the vertebral shields are of moderate width; in both, the hinder border of the shell is serrated. Length of the carapace, 181 mm; its width, 118 mm.

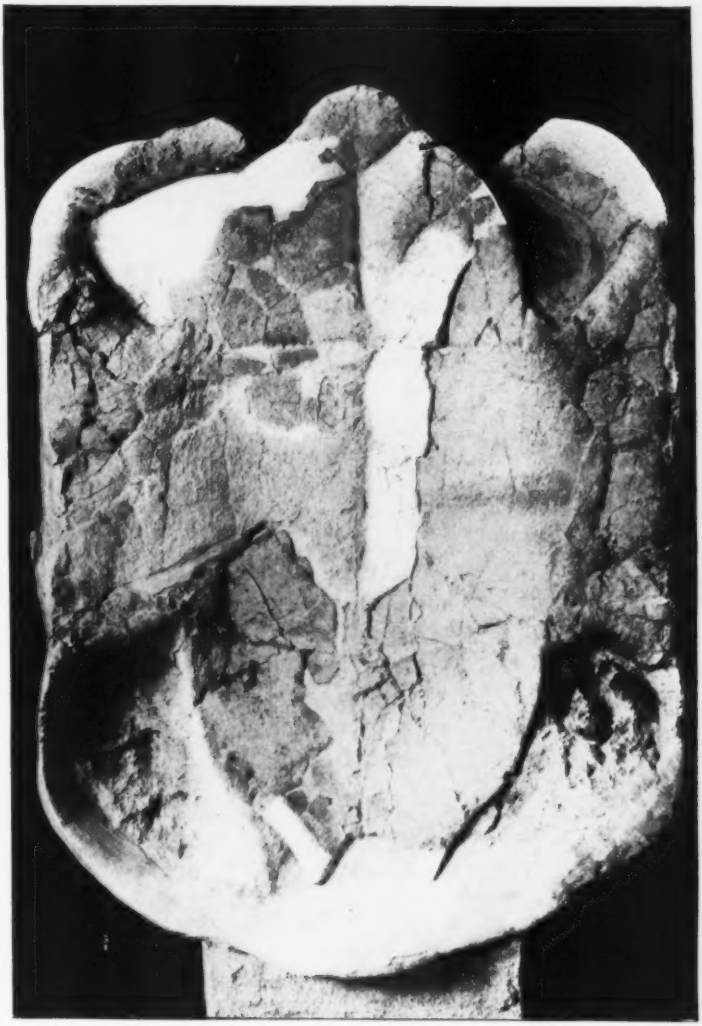
Certain described genera of fossil turtles display vertebral shields as broad, perhaps, as those of the form here described. Among these may be mentioned *Hylæochelys*, which is figured by Dr. Lydekker.[2] In this genus, however, the neural bones are long and narrow. *Plesiochelys*, a figure of which may be found in Zittel's Handbuch, page 545, also has very broad vertebral shields; but here again the neurals are narrow. *Platychelys*[3] is also furnished with broad vertebrals, but it is in many respects different from *Acherontemys*. The neurals are very irregular in form and size; the carapace has a different form and is covered with large bosses.

It is to be hoped that Mr. Heckman will be able, through the miners in his employ, to secure other specimens of this species, so that the structure of the plastron may be determined.

[1] Pages 22, 25.

[2] Catalogue of the fossil Reptilia and Amphibia, Pt. 3, p. 188, fig. 43.

[3] Lydekker, Catalogue of the fossil Reptilia and Amphibia, Pt. 3, p. 217, fig. 48; Zittel, Handbuch, III, p. 533, fig. 499.



HADRIANUS SCHUCHERTI.

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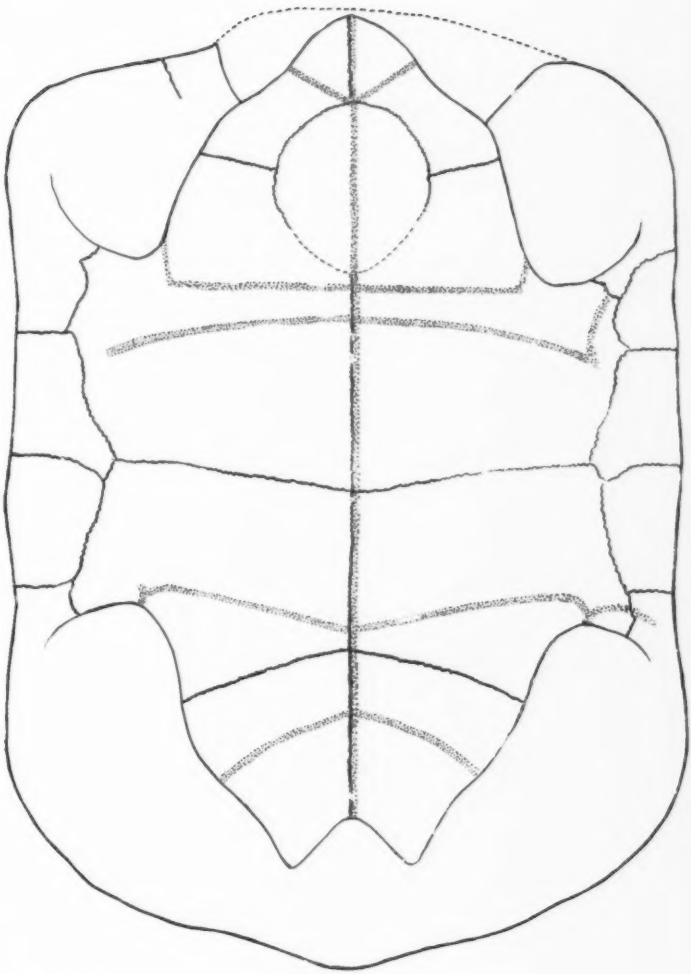

HADRIANUS SCHUCHERTI.

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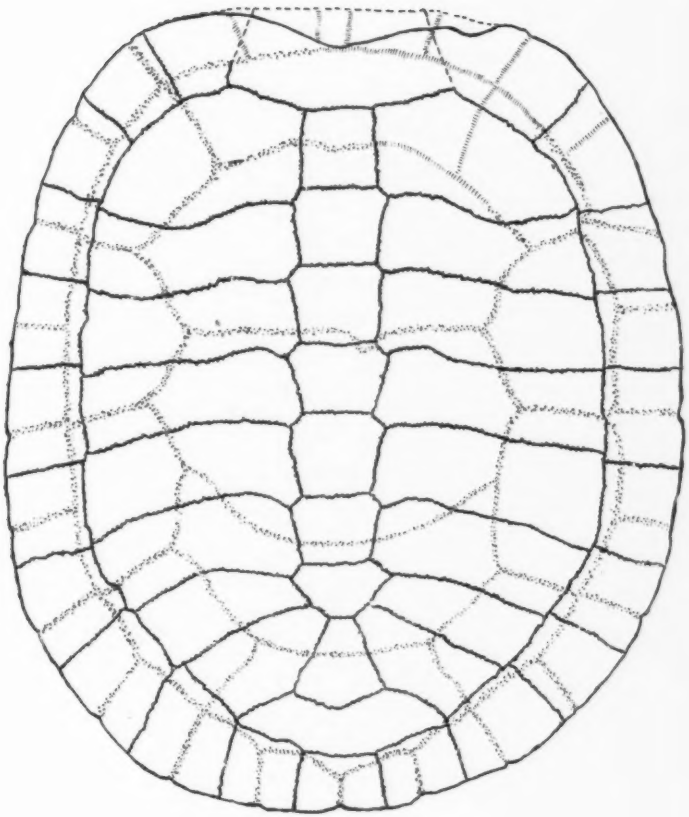

ACHERONTEMYS HECKMANI.

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A LIST OF THE BIRDS COLLECTED BY MR. R. P. CURRIE IN LIBERIA.

By HARRY C. OBERHOLSER,
Assistant Biologist, Department of Agriculture.

Although Mr. Currie's trip to Liberia, under the auspices of the United States National Museum, was largely devoted to the collecting of insects, he nevertheless managed during his sojourn in that country, from February 1 until May 10, 1897, to obtain a small series of birds. These specimens, 57 in number, were referred to the writer for determination and report. They prove to represent 39 forms, 4 of which are here described as new, while another, *Dryotriorchis spectabilis*, is sufficiently rare to be worthy of special mention. All the matter between quotation marks, together with the data relating to length, extent, colors of the unfeathered parts, as well as the Liberian, or English, and Golah, or native, names are from Mr. Currie's notes. The writer is also in debted to him for information respecting the locality at which the birds were secured.

Mount Coffee, where Mr. Currie's collecting was done, is one of the numerous low hills along the St. Paul River, about 25 miles from Monrovia. The land, which begins to rise near the coast, attains in the vicinity of Mount Coffee an altitude of from 400 to 500 feet. The greater portion of the region is covered with heavy tropical forest, interrupted here and there by small clearings. The undergrowth in the forest is not particularly heavy, but abandoned rice fields are, under the influence of the hot, moist climate, rapidly converted into impenetrable thickets. The river, here about 100 yards in width, flows with considerable current over an exceedingly rocky bed and receives the tribute of numerous minor streams. These latter, particularly when they run through the forest, are, like the clearings, favorite resorts for birds.

Family CURSORIIDÆ.

GALACHRYSIA MARCHEI (Oustalet).

Glareola marchei OUSTALET, Bull. Soc. Philom., I, 1877, p. 104.
Galactochrysea marchii SHARPE, Cat. Birds Brit. Mus., XXIV, 1896, p. 726.

Two adult males and an immature female, all taken along the St. Paul River. The two adults measure, respectively: Length, 180.6, 185.6 mm.; expanse, 450, 465.5 mm.

Family RALLIDÆ.

SAROTHRURA PULCHRA (Gray).

Crex pulchra J. E. GRAY, in Griffith's ed. Cuvier, Anim. Kingd., Aves, pp. 410, 542.
Sarothrura pulchra STONE, Proc. Acad. Nat. Sci. Phila., 1894, p. 148.

One adult male of this pretty rail is in the collection. Length, 177 mm.; expanse, 254.5 mm. "Bill dark horn or blackish, paler at base beneath; feet black."

Family PHASIANIDÆ.

FRANCOLINUS AHANTENSIS Temminck.

Francolinus ahantensis TEMMINCK, Bijdr. tot de Dierk., I, 1854, p. 49, pl. 14.

One adult female. Length, 353 mm.; expanse, 534 mm. The English name of the species is "Guinea fowl" in Liberia; in the Golah dialect it is "Chīne-chīlo."

Family FALCONIDÆ.

DRYOTRIORCHIS SPECTABILIS (Schlegel).

Astur spectabilis SCHLEGEL, Nederl. Tijdschr., I, 1864, p. 13, pl. 6.
Dryotriorchis spectabilis SHARPE,[1] Cat. Birds Brit. Mus., I, 1874, p. 279.

One fine adult example of this rare hawk is in the collection. The entire upper surface, excepting the tail and the wing quills, has a distinct slaty cast; otherwise this individual agrees perfectly with published descriptions. Length, 546 mm.; expanse, 953 mm. It was shot in the forest, and was in the act of swallowing a green snake, part of which was subsequently found in its throat. Mr. Currie states that it was very tame and unsuspicious. Golah name of the species, "Seepwah."

The specimen obtained by Mr. Currie is apparently the ninth of which any record has been published. All of these have come from a restricted area on the western coast of Africa extending only from Liberia to Gaboon. A list of those previously recorded is here added:

1. One specimen from Elmina, Gold Coast. Schlegel, Nederl. Tijdschr., I, 1864, p. 13, pl. 6.
2. One adult, from the interior of Fantee. Shelley, Ibis, 1874, p. 90.
3. One young, from Gaboon. Gurney, Proc. Zool. Soc., 1880, p. 621.
4. One adult female, from the Du Queah River, Liberia. Büttikofer, Notes Leyden Mus., VIII, 1886, p. 246.
5. One adult male, from Schieffelinsville, Liberia. Büttikofer, Notes Leyden Mus., X, 1888, p. 65.
6. One specimen, from Barombi, Cameroons. Reichenow, Journ. f. Orn., 1895, p. 102.
7. One, from Sebbe, Togo, alive in the Berlin Zoological Garden. Ornith. Monatsberichte, II, 1894, p. 128; Reichenow, Journ. f. Orn., 1895, p. 102.
8. One female, from Victoria, Cameroons. Reichenow, Journ. f. Orn., 1896, p. 7.

[1] The authority for this combination is usually quoted as Shelley, Ibis, 1874, p. 90, but Dr. Sharpe (Cat. Birds Brit. Mus., I, 1874, p. 279), seems to have been the first actually to write *Dryotriorchis spectabilis*.

Family MUSOPHAGIDÆ.

TURACUS MACRORHYNCHUS (Fraser).

Corythaix macrorhynchus FRASER, Proc. Zool. Soc., 1839, p. 34.
Turacus macrorhynchus GRAY, Gen. Birds, II, 1845, p. 395.

One adult male, taken April 22, 1897. It is in fresh plumage with indications of a not quite completed molt. "Feet black;" length, 439 mm.; expanse, 512 mm. Called "Redwing" by English-speaking Liberians.

Family CUCULIDÆ.

CENTROPUS SENEGALENSIS (Linnæus).

Cuculus senegalensis LINNÆUS, Syst. Nat., 12th ed., I, 1766, p. 169.
Centropus senegalensis KUHL and SWINDEREN, Buff. and D'Aub. Nom. Syst., 1820, p. 6.

A single specimen is in the collection, a young bird just acquiring its first plumage, killed April 16, 1897. Although many of the feathers are still in their sheaths, and the wings and tail very imperfectly developed, a brief description of the plumage may be of interest. Head, cervix, and tail dull black, the last with ill defined brown bars; back, scapulars, and upper surface of wings bright chestnut, heavily barred with black, these bars decreasing in width and regularity on the outer feathers of the wings; under surface vinaceous cinnamon, much paler on the middle of the posterior portion. This specimen is one of two which Mr. Currie kept for some time alive. (See Plate VII.)

Family CORACIIDÆ.

EURYSTOMUS GULARIS Vieillot.

Eurystomus gularis VIEILLOT, Nouv. Dict. d'Hist. Nat., XXIX, 1819, p. 426.

One specimen, a male. Length, 263 mm.; alar expanse, 516 mm.

EURYSTOMUS AFER (Latham).

Coracias afra LATHAM, Ind. Orn., I, 1790, p. 172.
Eurystomus afra STEPHENS, in Shaw's Gen. Zool., XIII, 1826, p. 97.

One male, taken in a clearing; the only one seen. Length, 260 mm.; expanse, 533 mm. Golah name, "Bah-yiddie."

Family MEROPIDÆ.

MEROPS ALBICOLLIS Vieillot.

Merops albicollis VIEILLOT, Nouv. Dict. d'Hist. Nat., XIV, 1817, p. 15.

Three specimens, sex uncertain. The species is reported by Mr. Currie to be common. "Bill black; feet olive-green; iris crimson." Called "Dry-time bird" in English; the Golah name is "Way-dwa." There is very little individual difference observable in these specimens, even in size. Two of them—one taken February 13, the other March 13—are molting the tail feathers.

MELITTOPHAGUS GULARIS (Shaw and Nodder).

Merops gularis SHAW and NODDER, Nat. Misc., IX, 1798, pl. 337.
Melittophagus gularis GRAY, Gen. Birds, I, 1846, p. 86, pl. 30.

Two specimens, male and female. "Bill and feet black; iris crimson."

Male.—Length, 219.5 mm.; extent, 304 mm.

Female.—Length, 205 mm.; extent, 297 mm.

There seems to be no observable difference in color between the sexes.

Family BUCEROTIDÆ.

ORTHOLOPHUS LEUCOLOPHUS (Sharpe).

Berenicornis leucolophus SHARPE, Zool. Rec. for 1871, 1873, p. 54.
Orthlophus leucolophus GRANT, Cat. Birds Brit. Mus., XVII, 1892, p. 426.

One female, taken April 30, 1897. Length, 684 mm.; extent, 650 mm. This is an immature specimen, with black throat, and agrees with the description of the young of *leucolophus* given by Mr. Ogilvie-Grant,[1] except for the presence of a conspicuous buffy white spot on the outer webs of most of the primaries.

LOPHOCEROS SEMIFASCIATUS (Hartlaub).

Buceros semifasciatus HARTLAUB, Journ. für Orn., 1855, pp. 356, 361.
Lophoceros semifasciatus SHELLEY, Ibis, 1888, p. 59.

A pair of adult birds is in the collection. According to Mr. Currie's notes, both were shot in the forest near the clearing at Mount Coffee. The English-speaking Liberians call this species "Palm bird," while the Golah name is "Pwehah-pwehah."

One of the specimens was taken February 23, the other March 19, 1897; both show indications of a molt not quite completed. The naked skin on the sides of the throat is slate black, not blue, as given by Mr. Ogilvie-Grant.[2] The feet and the bare skin encircling the eyes are also black.

Male.—Length, 600 mm.; expanse, 800 mm.

Female.—Length, 570 mm.; expanse, 800 mm.

HORIZOCERUS,[3] new genus.

Chars. gen.—Genus generi "Lophoceros" dicto affine, sed cauda valde cuneata, rostro prope recto, hujus cornu minimo, acute carinato, facile distinguendum.

Type.—*Toccus hartlaubi* Gould.

The strongly wedge-shaped tail, comparatively straight bill, with its very small, *sharply* keeled casque, to say nothing of conspicuous color differences, appear fully to justify the creation of a separate genus for

[1] Cat. Birds Brit. Mus., XVII, 1892, p. 426.
[2] Idem., p. 401.
[3] ὁρίζω, limito; κέρας, cornu.

the species commonly known as *Lophoceros hartlaubi*. In fact, it bears less apparent relationship to the species with which it has usually been associated than it does to *Ortholophus leucolophus*. From *Ortholophus* the present genus may be satisfactorily distinguished by the absence of a conspicuous crest, and particularly by the comparative length of the tail, which is barely longer than the wing, instead of about twice as long.

HORIZOCERUS HARTLAUBI (Gould).

Toccus hartlaubi GOULD, Proc. Zool. Soc., 1860, p. 380.

One adult male, just completing the molt, taken February 19, 1897. "Bill slate black, the tip dark red; feet slate color;" length, 406 mm.; expanse, 445 mm. The Liberian English name of this species is "Monkey-bird," because of its alleged habit of following monkeys; in the Golah language it is called "Hin-gongeh."

Family CAPITONIDÆ.

BARBATULA DUCHAILLUI Cassin.

Barbatula duchaillui CASSIN, Proc. Acad. Nat. Sci. Phila., 1855, p. 324.

One adult male. Length, 177 mm.; extent, 266 mm. "Bill black; feet nearly so."

Family PICIDÆ.

DENDROMUS CAROLI ARIZELUS, new subspecies.

Campothera caroli BÜTTIKOFER, Notes Leyden Mus., VII, 1885, p. 221 (*nec* Malherbe).

Chars. subsp.—Similar to *Dendromus caroli*, but entire under surface, including lower tail-coverts, clear uniform olive green, the spots apparently smaller and less numerous; these, together with superciliary stripe, lining of wing, light markings on outer webs of primaries, and inner webs of secondaries, strongly tinged with greenish, not buffy; spots on exterior webs of primaries much smaller; rufous area on side of head lighter and more yellowish; crown distinctly more olive greenish.

Length, 178 mm.; expanse, 340 mm.; wing, 101 mm.; tail, 60 mm.; exposed culmen, 24 mm.; tarsus, 19 mm.; middle toe, 17 mm.

Description.—Type, adult male; No. 161763, U.S.N.M.; Mount Coffee, Liberia, February 19, 1897; R. P. Currie. Above golden olive green, the head much duller, and its feathers tipped with dark red; a few more or less concealed spots of pale greenish on the feathers of the hind neck. Wings fuscous, the exposed surface when closed, in color like the back; outer webs of primaries with small spots of greenish yellow; inner webs of all the quills, at least basally, with wide indentations of the same color. Tail brownish black, the outer feathers with small lateral spots of greenish yellow. Under surface greenish olive, heavily spotted with greenish yellow, these markings largest posteriorly; superciliary stripe greenish yellow; postocular region, including auric-

ulars, reddish chestnut; under wing-coverts and axillars light greenish yellow with a decided buffy tinge. Bill in life slate color; tarsi dull light green.

The single specimen obtained by Mr. Currie differs so much from a Gaboon example, as above indicated, that it without doubt represents an undescribed race, if, indeed, not a distinct species. It is evidently the same as Dr. Büttikofer's specimens from Liberia, exhibiting all the differences from true *caroli* mentioned by him,[1] as well as others which apparently escaped his notice. The specimen at hand from Gaboon, the original locality of *caroli*, corresponds closely with published descriptions of this form, and is apparently a typical example. No specimens from the territory intervening between Liberia and Gaboon have been available in the present connection; but the differences between *caroli* and *arizelus* are such as seem to indicate subspecific relationship, and *arizelus* has, therefore, been given a trinomial designation.

Family MOTACILLIDÆ.

MOTACILLA VIDUA Sundevall.

Motacilla vidua SUNDEVALL, Œfv. K. Vet. Akad. Forh. Stockh., 1850, p. 128.

One specimen, an adult male in breeding plumage.

Family PYCNONOTIDÆ.

STELGIDILLAS,[2] new genus.

Chars. gen.—Genus generi "Chlorocichla" dicto simile, sed maxillæ tomii parte subterminali distincte serrata; nec corpore subtus clare flavescente.

Type.—*Andropadus gracilirostris* Strickland. The uncertainty which has attended the determination of the proper generic affinities of *Andropadus gracilirostris* has led to the placing of this species in three different genera, with the characters of none of which does it sufficiently agree. From *Criniger* it may be at once distinguished by the depressed and slender bill—the maxilla with serrations on the cutting edge just posterior to the subterminal notch. The narrow, depressed bill separates it easily from either *Andropadus* or *Eurillas*, while from *Chlorocichla*, to which it seems to be most closely allied, it differs in the presence of serrations on the distal portion of the maxillar tomium. All the known species of *Chlorocichla*, moreover, are yellow or yellowish olive below, and the genus, as restricted by Captain Shelley,[3] is a well-defined group.

The species described by Cabanis as *Andropadus gracilis*[4] is not perfectly typical, but should apparently be associated generically with *gracilirostris*. The genus will then include *Stelgidillas gracilirostris*

[1] Notes Leyden Museum, VII, 1885, p. 221.
[2] στελγίς, strigilis; ἰλλάς, turdus.
[3] Birds of Africa, I, 1896, p. 63.
[4] Orn. Centralbl., 1880, p. 174.

(Strickland), *Stelgidillas gracilirostris liberiensis* (Reichenow), *Stelgidillas gracilis* (Cabanis).

STELGIDILLAS GRACILIROSTRIS LIBERIENSIS (Reichenow).

Andropadus gracilirostris liberiensis REICHENOW, Novit. Zool., II, 1895, p. 160.

One specimen, April 1, with molt not yet entirely completed. It agrees perfectly with Dr. Reichenow's description of *liberiensis* which seems to be a sufficiently well characterized subspecies of *Stelgidillas gracilirostris*.

The measurements of this example are: Length, 199 mm.; extent, 262 mm. "Bill black, lower mandible slightly paler beneath; feet black; iris crimson."

BLEDA SYNDACTYLA (Swainson).

Dasycephala syndactyla SWAINSON, Birds W. Af., I, 1837, p. 261.
Bleda syndactyla RICHMOND, Auk, XVI, April, 1899, p. 183.

One adult male, apparently typical. Length, 251 mm.; extent, 330.5 mm.; "iris deep red."

EURILLAS VIRENS (Cassin).

Andropadus virens CASSIN, Proc. Acad. Nat. Sci. Phila., 1857, p. 34.
Eurillas virens OBERHOLSER, Proc. U. S. Nat. Mus., XXII, 1899, p. 15.

One specimen, taken April 1, an immature male, in the plumage described by Dr. Hartlaub as *Andropadus erythropterus*. "Bill black, lighter apically; feet light horn brown."

PYCNONOTUS BARBATUS (Desfontaine).

Turdus barbatus DESFONTAINE, Mém. Acad. Roy. de Sciences, p. 500, pl. XIII.
Pycnonotus barbatus GRAY, Hand-list Birds, I, 1869, p. 268.

Two specimens, taken February 12 and April 28, respectively. Both are in worn breeding plumage; and the latter has apparently just begun to molt. One of them has an appreciable wash of yellow on the lower tail-coverts. "Bill and feet black; iris reddish brown. The English-speaking Liberians know this species as the "Pepper bird;" in the Golah dialect it is called "Bweh-lay."

Family MUSCICAPIDÆ.

TCHITREA NIGRICEPS Hartlaub.

Tchitrea nigriceps HARTLAUB, Journ. f. Orn., 1855, pp. 355, 361 (ex Temminck manuscript).
Terpsiphone nigriceps SHARPE, Proc. Zool. Soc., 1874, p. 306.

Two adult specimens, male and female. The former is a very handsome bird in perfect plumage; the latter agrees with Dr. Sharpe's description of the supposed female,[1] being very much duller colored. The upper parts, excepting, of course, the head, are considerably darker

[1] Cat. Birds Brit. Mus., IV, 1879, p. 360.

than in the male, while the under surface, particularly the posterior portion, is lighter.

Male.—Length, 190 mm.; extent, 203 mm.; "bill and feet bright blue black."

Female.—Length, 153 mm.; extent, 215 mm.; "bill dark horn, paler at base; feet blue black."

The Golah name of this bird is "Wee-su-waw."

ARTOMYIAS USSHERI Sharpe.

Artomyias usshæri SHARPE, Ibis, 1871, p. 416.

Two specimens, adult male and female. The male is slightly paler and more grayish than the female, but otherwise identical. They agree with Dr. Sharpe's description[1] except for the lack of whitish tips to the wing quills and greater coverts. These whitish tips are probably, as suggested by Dr. Sharpe,[1] evidences of immaturity.

These two individuals measure as follows: Male, length, 140 mm.; extent, 254 mm.; female, length, 142 mm.; extent, 264 mm. It is interesting to notice the larger size of the female. The Golah name for the species is "Bweh-bweh-dee."

Family NECTARINIIDÆ.

ANTHREPTES RECTIROSTRIS (Shaw).

Certhia rectirostris SHAW, Gen. Zool., VIII, 1811, p. 246.
Anthothreptes rectirostris GADOW, Cat. Birds Brit. Mus., IX, 1884, p. 119.

Four specimens. The two adult males appear not to differ from typical examples, though one is rather lighter below than the other, besides being considerably smaller. Length, 99 mm.;[2] extent, 182 mm.; length, 112.6 mm.; extent, 173 mm. "Bill and feet black; iris chocolate brown."

Another specimen is sexed female with a query, and may possibly be an immature male. Length, 108 mm.; expanse, 167 mm. The upper surface is dull greenish olive with a conspicuous mixture of bronzy tipped feathers; the lesser wing-coverts are bronze green; the under parts are yellow, clearest on the median portion of the abdomen, shaded with olive green on the sides, paler on the throat and duller on the breast, both of which are slightly tinged with ashy.

The fourth specimen is a young bird in first plumage, and is apparently *rectirostris*, although so young that without more specimens for examination it cannot be determined with absolute certainty. The upper surface is dull olive washed with greenish; wings dark brown with exterior edgings of golden olive; under parts pale dull yellow, the throat only washed with this color, as it is so imperfectly feathered that the slate gray bases of the feathers give their tint to the whole area.

[1] Cat. Birds Brit. Mus., IV, 1879, p. 145. [2] Tail imperfect.

ANTHREPTES COLLARIS HYPODILUS (Jardine)

Nectarinia hypodilus JARDINE, Contr. Orn., 1851, p. 153.

Two specimens, male and female. "Bill and feet black, iris brown."

Male.—Length, 109.2 mm.; extent, 148.5 mm.

Female.—Length, 102 mm.; extent, 144 mm. The latter shows indications of a molt not quite completed.

This species is apparently divisible into three well defined geographical races. In southern Africa occurs *Anthreptes collaris collaris;* in southeastern Africa *Anthreptes collaris zambesianus*, and in the western part of the continent *Anthreptes collaris hypodilus.* True *collaris* differs from both of the other forms in having the secondaries, greater and primary coverts edged externally with golden olive instead of metallic green; the posterior lower parts are much darker and duller yellow than in *zambesiana;* less orange yellow and more shaded with olivaceous laterally than in *hypodilus.* From *hypodilus*, with which it has usually been considered identical, *zambesianus* may be readily distinguished by the much paler, less orange tinted posterior under surface, as well as by the paler shade of the exterior margins to secondaries, primary and greater wing-coverts.

ANTHREPTES IDIUS, new species.

Chars. sp.—Similar to *Anthreptes fraseri*, but decidedly smaller; the outermost primary scarcely more than half as long; rather darker, and much less yellowish olive green throughout. This most noticeable on wings and tail.

Description.—Type, male (immature?), No. 161807, U.S.N.M.; Mount Coffee, Liberia, March 16, 1897; R. P. Currie. Upper parts dark olive green, rather duller on the head; wings fuscous, the lesser coverts, edgings of the others and of the quills, like the back; tail-feathers greenish olive, with broad olive green exterior margins. Sides of head and neck olive green; eye ring olive yellow; entire under surface deep olive yellow, almost uniform, but rather paler on chin, and shaded with olive green on sides and flanks; lining of wing olive yellow. "Bill dark horn, paler beneath; feet olive green." Length, 122 mm.; extent, 178 mm.

In details of structure and in pattern of coloration this new species is identical with *Anthreptes fraseri*, and does not need comparison with any of the other species of the genus. There is a possibility that *idius* may eventually turn out to be merely a geographical race of *fraseri*, but until such shall be proved to be the case it may stand as a species. The single specimen procured by Mr. Currie is sexed male, and if this be correct the absence of pectoral tufts, notwithstanding the lack of any other evidence, would seem to indicate immaturity; for it is quite probable, though of course not certain, that the adult male would, like that of *fraseri*, possess these ornaments.

The following table shows the comparative size of the two species:

Measurements.

Name.	Wing.	Tail.	Tarsus.	Middle toe.
	mm.	*mm.*	*mm.*	*mm.*
Anthreptes fraseri, adult female	64	42	16	9.5
Anthreptes idius, male [immature?]	54	38	14	9

Mr. Currie states that this species was not uncommon in the "bush" about Mount Coffee, and that its Golah name is "Zemeh."

CINNYRIS CYANOLÆMA (Jardine).

Nectarinia cyanolæma JARDINE, Contr. Orn., 1851, p. 154.
Cinnyris cyanolæmus SHARPE and BOUVIER, Bull. Soc. Zool. France, I, 1876, p. 41.

Three specimens—male, female, and young male. The two first are apparently typical birds in breeding plumage; "bill and feet black;" length of female, 139 mm.; extent, 200 mm. The immature male differs from the adult female in being darker, more sooty above, including wings and tail; the top of the head is sooty blackish instead of olive brownish; the sides of head and neck blackish slate instead of light brownish; the throat dull white, washed with olive yellow instead of light brownish, and *sharply* defined from the surrounding darker areas; breast and abdomen light olive green instead of brownish white; lining of wing sooty grayish instead of whitish.

The Golah name of the adult male of this species is "Zemeh-dee;" the young male is called "Zemeh," thus not distinguished from *Anthreptes idius*.

CINNYRIS JOHANNÆ Verreaux.

Cinnyris johannæ J. and E. VERREAUX, Rev. et Mag. Zool., 1851, p. 314.

One adult male of this brilliantly plumaged sunbird is in the collection. "Bill and feet jet black;" length, 145.6 mm.; extent, 209 mm.

CINNYRIS CHLOROPYGIA (Jardine).

Nectarinia chloropygia JARDINE, Ann. and Mag. Nat. Hist., X, 1842, p. 188.
Cinnyris chloropygius BONAPARTE, Consp. Avium, I, 1850, p. 407.

One adult male. "Bill and feet black;" length, 103 mm.; extent, 133 mm. Mr. Currie reports the species common in the vicinity of Mount Coffee. In the Golah dialect it is called "Zemeh," a name apparently applied indiscriminately to a number of small birds.

Family PLOCEIDÆ.

MALIMBUS SCUTATUS (Cassin).

Scobius[1] *scutatus* CASSIN, Proc. Acad. Nat. Sci. Phila., 1849, p. 157.
Malimbus scutatus GRAY, Hand-List Birds, II, 1870, p. 43.

Two adult specimens, male and female. "Bill and feet black; iris crimson." Length, male, 175 mm.; expanse, 282 mm. Length, female, 172 mm.; expanse, 266 mm.

[1] Typographical error for *Sycobius*.

MALIMBUS RUBRICOLLIS BARTLETTI (Sharpe).

Malimbus bartletti SHARPE, Cat. Birds Brit. Mus., XIII, 1890, p. 479.

One adult male. "Bill black; feet purplish-black; iris chocolate brown." Length, 214 mm.; expanse, 337 mm. Golah name, "Way-see-eh." This form undoubtedly intergrades with the more southern *Malimbus rubricollis*, to which it is closely related; and its name should thus be, as above given, a trinomial.

NIGRITA BICOLOR (Hartlaub).

Pytelia bicolor HARTLAUB, Syst. Verz. Bremen, 1844, p. 76.
Nigrita bicolor SCLATER, Contr. Orn., 1852, p. 83.

One specimen, apparently not different from a Fantee example. "Bill black; feet dark brown; iris crimson." Length, 114 mm.; extent, 163.5 mm.

AMAURESTHES FRINGILLOIDES (Lafresnaye).

Ploceus fringilloides LAFRESNAYE, Mag. de Zool., 1835, pl. 48.
Amauresthes fringilloides REICHENBACH, Singv., 1861, p. 86, pl. 44, fig. 322.

One specimen, April 22, 1897, in fresh plumage, with molt not quite completed. Length, 135 mm.; expanse, 195 mm.

Family HIRUNDINIDÆ.

HIRUNDO NIGRITA Gray.

Hirundo nigrita GRAY, Gen. Birds, I, 1845, pl. 40.

Three specimens, two males and one female, April 13 and 28, 1897, all showing some indication of incomplete molt. The latter seems to be somewhat less purplish than the males, but there is no other apparent difference. One of the males measures, length, 142 mm.; extent, 303 mm. "Bill and feet black."

Family DICRURIDÆ.

DICRURUS MODESTUS ATACTUS, new subspecies.

Chars. subsp.—Similar to *Dicrurus modestus modestus*, but plumage of body, particularly above, much more glossy, the velvety appearance almost entirely absent; no conspicuous contrast between the feathers of head and back.

Wing, 118 mm.; tail, 104 mm.; exposed culmen, 22 mm.; tarsus, 20 mm.; middle toe, 15 mm.

Description.—Type, sex unknown, No. 147202, U.S.N.M.; Fantee, West Africa. General color glossy black, with bluish metallic reflections, these most evident on the upper parts, nearly absent on the throat; top of head almost uniform with the back, though slightly greenish, as are the upper tail-coverts; wings brownish black, the lesser coverts like the back, the remaining coverts and the quills glossed

externally with greenish blue; tail brownish black, glossed exteriorly with greenish.

Comparison of specimens from Fantee and Liberia with an adult from Gaboon seems to indicate the existence of two races of *Dicrurus modestus*. True *modestus* comes from Prince's Island, and according to Dr. Sharpe[1] *D. coracinus* from Gaboon is identical with *modestus*, as it should be from a geographical standpoint, thus leaving the northern form without a name. Dr. Sharpe also mentions[1] the more glossy appearance of specimens from the Gold Coast, but without separating them from *modestus*.

Mr. Currie obtained one specimen, an immature male, apparently identical with examples from Fantee. Length, 225 mm.; expanse, 251 mm. It was shot in the forest, where the species is stated by Mr. Currie to be not uncommon. Golah name, "Zăla-we."

DICRURUS ATRIPENNIS Swainson.

Dicrurus atripennis SWAINSON, Birds W. Africa, I, 1837, p. 256.

One adult male, March 16, 1897. It is in process of molt, wings and tail being imperfect. Taken in the forest; "not uncommon." Length, 235 mm.; expanse, 321 mm.; "bill and feet black; iris crimson." Golah name, "Zăla-we."

Family LANIIDÆ.

LANIARIUS MULTICOLOR Gray.

Laniarius multicolor GRAY, Gen. Birds, I, 1845, p. 299, pl. 72.

The collection contains one adult male of this brilliantly colored shrike. Length, 230 mm.; expanse, 317 mm. Mr. Currie states that no others were seen. Golah name, "Dah-zo." Bill in life black; feet drab; eyelid purplish.

Family STURNIDÆ.

PHOLIDAUGES LEUCOGASTER (Gmelin).

Turdus leucogaster GMELIN, Syst. Nat., I, 1788, p. 819.
Pholidauges leucogaster CABANIS, Mus. Hein., I, 1850, p. 198.

One specimen, an immature male in the plumage of the female. "Bill black, paler at base below; feet black; iris lemon." Length, 184 mm.; extent, 306 mm.

Family PRIONOPIDÆ.

SIGMODUS CANICEPS Bonaparte.

Sigmodus caniceps BONAPARTE, Consp. Av., I, 1850, p. 365.

One adult male, apparently a typical specimen. Length, 225 mm.; extent 348 mm. "Iris bright yellow; bill deep crimson, lighter

[1] Cat. Birds Brit. Mus., III, 1877, p. 233.

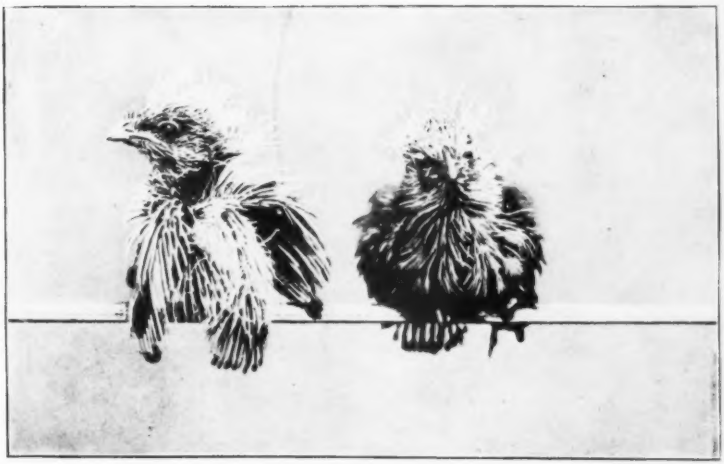
toward the tip; feet vermilion; naked ring around eye orange red." Known to English-speaking Liberians as "Baboon bird;" Golah name, "Way-ye."

FRASERIA PROSPHORA, new species.

Chars. sp.—Similar to *Fraseria ochreata;* the crown, sides of head, and neck not blackish, but uniform in color with the back; lower surface not pure white, the markings not sharply defined.

Description.—Adult, sex undetermined, No. 161784, U.S.N.M.; Mount Coffee, Liberia, February 19, 1897; R. P. Currie. Upper surface uniform slate color, slightly more bluish on lower back and rump; wing-quills and tail-feathers dull brownish black, edged externally with slate color; sides of head and neck like the crown. Lower parts grayish white; the sides and flanks slate gray; the jugulum a lighter shade of same, spotted with darker; the feathers of breast and abdomen with narrow slate-gray tips, producing a slightly squamated effect; lower tail-coverts each with a subbasal, V-shaped marking, and a narrow terminal bar of slate color; inferior wing-coverts brownish slate, the feathers broadly tipped with white; axillars white terminally, slate gray basally; thighs slate gray, edged with white. "Bill slate black; feet plumbeous." Wing, 87.5 mm.; tail, 73 mm.; exposed culmen, 14 mm.; tarsus, 21.5 mm.; middle toe, 14 mm.

This new form is distinguishable at sight from *Fraseria ochreata* by the lighter and uniform shade of the upper surface, including the sides of head and neck; by the grayish instead of pure white under parts, the markings of which are much paler and much less sharply defined, giving a clouded and mottled appearance in place of a clear-cut squamate effect, particularly on breast and jugulum. The crissum is irregularly barred with slate color instead of being pure white. While it is barely possible that *prosphora* is a race of *ochreata*, and thus its representative in Liberia, yet the two birds are so different that until the connection be established it seems better to accord them both specific rank.



YOUNG "TOO-TOO" BIRDS (*Centropus senegalensis*)

Mount Coffee, Liberia.

From a photograph by Mr. G. N. Collins.

A LIST OF THE BITING LICE (MALLOPHAGA) TAKEN FROM BIRDS AND MAMMALS OF NORTH AMERICA.

By VERNON L. KELLOGG, M. S.,
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Within the last few years a beginning in the systematic study of the North American Mallophaga has been made. This study has progressed sufficiently to make it worth while to prepare a list of the Mallophaga so far recorded as having been collected from birds and mammals found in North America.[1] By this is meant the record of collection actually made from American host specimens, and not from host species common to both Europe and America, from which parasites are as yet recorded only from European host specimens. Where Mallophaga have been found common to American and European hosts, the foreign as well as the native hosts are given. As the synonymy for the species of Mallophaga found on American hosts has been given in both Professor Osborn's and my own papers (these papers including practically all the American records), I have not repeated the synonymy in the list. All the American records as originally published are included in the list, no attempt having been made to correct the synonymy. Probably not more than half a dozen species in the list are liable to such correction. The American specimens referred to species originally found on European hosts have been so referred on the authority of the original descriptions and illustrations of European authors. The great importance of the correctness of these determinations, because of the interesting problems in distribution presented by this specific identity of European and American specimens, led me to take to Europe a large number of American specimens for the sake of comparison with the European types. This comparison revealed the fact that these determinations of the identity of the American specimens with European species can be relied on.

In addition to the list of parasites with hosts there is given also a list of hosts with parasites, so that reference to the American records can be readily made from either parasite or host. Students beginning

[1] Some birds from Panama are included in this list. "North America," according to the American Ornithologists' Union check list, "includes the continent of North America north of the present United States and Mexican boundary, and Greenland and the peninsula of Lower California, with the islands naturally belonging thereto."

the study of the Mallophaga will soon discover the advantage of working from the basis of known host.

It is hoped that the list may serve as a convenient basis for the study of the phenomena of the distribution of the Mallophaga, one of the most interesting phases of the study of this group of insects.

Types and cotypes of my own and of Osborn's are now deposited in the U. S. National Museum.

BIBLIOGRAPHY.

There are very few records in the European literature of the Mallophaga of specimens taken from North American hosts. In very rare instances specimens have been taken from the skin of some North American bird in the collection of some European museum, or parasites have been collected in zoological gardens from representatives of some bird species peculiar to North America. For example, Piaget collected two species of Mallophaga from specimens of the Bob White (*Colinus virginianus*) and California Partridge (*Callipepla californica*) in the zoological garden at Rotterdam. I have since found both of these species of Mallophaga on the same hosts in their native habitat. All of these records are referred to in the list. The following are the American papers containing the records upon which the list is based. For an extended bibliography of the foreign and American literature of the Mallophaga see Osborn[1] and Kellogg.[2]

Packard A. S. Certain Parasitic Insects, American Naturalist, 1870, IV, p. 83, ill.

Leidy, J. Proc. Acad. Nat. Sci. Phila., 1878, p. 100.

Osborn, Herbert. Notes on Mallophaga and Pediculidæ, Canadian Entomologist, 1884, XII, p. 197.

The Pediculi and Mallophaga Infesting Man and the Lower Animals, Bull. No. 7, Div. of Ent., U. S. Dept. of Agric., 1891.

Insects Affecting Domestic Animals, Bull. No. 5, new ser., Div. of Ent., U. S. Dept. of Agric., 1896.

Kellogg, V. L. New Mallophaga, I (Contributions to Biology from the Hopkins Seaside Laboratory, IV, 1896).

New Mallophaga, II (Contributions to Biology from the Hopkins Seaside Laboratory, VII, 1896).

Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III (Contributions to Biology from the Hopkins Seaside Laboratory, XIX, 1899).

Kellogg, V. L., and Chapman, B. L. Mallophaga from Birds of California, in New Mallophaga, III (Contributions to Biology from the Hopkins Seaside Laboratory, XIX, 1899).

Chapman, Bertha L. Two New Species of Trichodectes (Mallophaga). Entomological News, 1897, VIII, p. 185, pl. IX.

CLASSIFICATION AND KEYS.

The position of the Mallophaga among insects is discussed briefly in my New Mallophaga.[3] The latest classification of insects assigns to the Mallophaga the position of an independent order. The affinities of the

[1] Insects Affecting Domestic Animals, Bull. No. 5, new ser., 1896, Div. of Ent., U. S. Dept. of Agric., p. 292.

[2] New Mallophaga, I, 1896, pp. 35, 40.

[3] Volume I, 1896, pp. 57–59.

order are in general with the platypterous pseudo-neuropteroid group comprising the Termites, Psocids, and Perlids, and are in particular with the Psocidæ. In the New Mallophaga[1] I refer to the correspondence between the peculiarly specialized mouth structure of the Mallophaga and the Psocidæ, and the recent careful study by Mr. R. E. Snodgrass[2] on the anatomy of the Mallophaga reveal other particulars of essential structural agreement between the two groups.

As to the arrangement of the members of the order, I have proposed[3] the adoption of a primary grouping into two suborders, corresponding with Nitzsch's original division of the group into two families. In each of these suborders there are two families, one family of each suborder infesting mammals exclusively and comprising but a single genus, the other family of each suborder, comprising several genera, infesting birds exclusively. Mr. Snodgrass's anatomical studies present new and important characters for the subdivision of the order which do not modify the original classification, but strengthen it and put it on a more thoroughly scientific basis. These new characters have been introduced into the following keys. I have made some other changes in the statement of the characters of the subordinate groups, based on my general study of the order and use of the keys as heretofore published.

ANALYTICAL KEY TO SUBORDERS OF MALLOPHAGA.

With filiform, 3- or 5-segmented, exposed antennæ; no labial palpi; mandibles vertical; œsophageal sclerite and accompanying glands usually present and normal; meso- and metathoracic segments fused; crop a saclike diverticulum; ingluvial glands present; testes, four; egg tubes, five.....ISCHNOCERA.

With clavate or capitate, 4-segmented, concealed antennæ; with 4 segmented labial palpi; mandibles horizontal; œsophageal sclerite and accompanying glands absent or modified; meso- and metathoracic segments with sutural line usually visible; crop, simple; ingluvial glands, absent; testes, six; egg tubes, three to five.....AMBLYCERA.

ANALYTICAL KEY TO GENERA OF THE SUBORDER ISCHNOCERA.

A. With 3-segmented antennæ; tarsi with one claw; infesting mammals (family Trichodectidæ).....*Trichodectes* Nitzsch.

AA. With 5-segmented antennæ; tarsi with two claws; infesting birds (family Philopteridæ).

B. Antennæ similar in both sexes.

C. Front deeply angularly notched.....*Akidoproctus* Piaget.

CC. Front convex, truncate, or rarely with a curving emargination, but never angularly notched.

D. Species broad and short, with large, movable trabeculæ (at the anterior angle of antennal fossa).

E. Forehead with a broad transverse membranous flap projecting beyond lateral margins of the head in the male, barely projecting in the female.....*Giebelia* Kellogg.

EE. Without such membranous flap.....*Docophorus* Nitzsch.

DD. Species elongate, narrow, with very small or no trabeculæ. *Nirmus* Nitzsch.

[1] Volume II, 1896, p. 468. [2] New Mallophaga, III, 1899.
[3] New Mallophaga, I, pp. 59–63.

BB. Antennæ differing in the two sexes.
C. Species wide, with body elongate-oval to suborbicular.
D. Temporal margins rounded; last segment of abdomen roundly emarginated; antennæ of male without appendage, third segment very long ..... *Eurymetopus* Taschenberg.
DD. Temporal margins usually angulated; last segment of abdomen convex, rarely angularly emarginated, with two points.
E. First segment of antenna of male large, sometimes with an appendage; third segment always with an appendage.
Goniodes Nitzsch.
EE. First segment of antenna of male enlarged, but always without appendage; third segment without appendage; last segment of abdomen always rounded behind.
Goniocotes Nitzsch.
CC. Species elongate, narrow, sides subparallel.
D. Third segment of antenna of male without an appendage.
Ornithobius Denny.
DD. Third segment of antenna of male with an appendage.
E. Front deeply angularly notched..... *Bothriometopus* Taschenberg.
EE. Front not angularly notched.
F. Antennæ and legs long; a semicircular oral fossa.
Lipeurus Nitzsch.
FF. Antennæ and legs short; oral fossa narrow, elongate, extending as a furrow to the anterior margin of the head.
Oncophorus Rudow.

ANALYTICAL KEY TO GENERA OF THE SUBORDER AMBLYCERA.

A. Tarsi with one claw; infesting mammals (family Gyropidæ) ... *Gyropus* Nitzsch.
AA. Tarsi with two claws; infesting birds (excepting Boopia?); (family Liotheidæ).
B. Ocular emargination distinct, more or less deep.
C. Forehead rounded, without lateral swelling; antennæ projecting beyond border of the head..... *Colpocephalum* Nitzsch.
CC. Forehead without strong lateral swellings.
D. Antennæ projecting beyond border of the head; temporal angles projecting rectangularly; eye large and simple.. *Boopia* Piaget.
DD. Antennæ concealed in groove on under side of the head; temporal angles rounded or slightly angular; eye divided by an emargination and fleck.
E. Mesothorax separated from metathorax by a suture.
Trinoton Nitzsch.
EE. Meso- and metathorax fused; no suture.
Læmobothrium Nitzsch.
BB. Ocular emargination absent or very slight.
C. Sides of the head straight or slightly concave, with two small, laterally projecting labral lobes..... *Physostomum* Nitzsch.
CC. Sides of the head sinuous; forehead without labral lobes.
D. Ocular emargination filled by a strong swelling; sternal markings forming a quadrilateral without median blotches.
Nitzschia Denny.
DD. Ocular emargination without swelling, hardly apparent or entirely lacking; median blotches on sternum.
E. Very large; with two 2-pointed appendages on ventral aspect of hind head; anterior coxæ with very long lobelike appendages.
Ancistrona Westwood.
EE. Small or medium; without bipartite appendages of hind head.
Menopon Nitzsch.

LIST OF MALLOPHAGA.

Order MALLOPHAGA Nitzsch.

Suborder ISCHNOCERA Kellogg.

Family PHILOPTERIDÆ Burmeister.

Genus DOCOPHORUS Nitzsch.

Docophorus NITZSCH, Germar's Mag. f. Ent., 1818, III, p. 289.

Docophorus kansensis KELLOGG, New Mallophaga, I, 1896, p. 91, pl. III, fig. 8.

From *Colymbus nigricollis californicus* (Lawrence, Kansas).

Docophorus graviceps KELLOGG, New Mallophaga, I, 1896, p. 82, pl. III, fig. 3.

From *Urinator pacificus* (Bay of Monterey, California) and *Fulica americana* (Pacific Grove, California).

Docophorus colymbinus DENNY, Monograph. Anoplur. Brit., 1842, p. 80, pl. VIII, fig. 8.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 217.

Recorded by Osborn from *Urinator lumme* (Burnett collection); taken by Kellogg from *Urinator pacificus* (Bay of Monterey, California); this record not before published.

Recorded by European authors from *Colymbus septentrionalis*, *C. arcticus*, *C. glacialis*, and *Tadorna cornuta*.

Docophorus acutipectus KELLOGG, New Mallophaga, I, 1896, p. 84, pl. III, fig. 4.

From *Cerorhinca monocerata* (Bay of Monterey, California).

Docophorus insolitus KELLOGG, New Mallophaga, I, 1896, p. 94, pl. IV, fig. 5.

From *Ptychoramphus aleuticus* (Bay of Monterey, California).

Docophorus montereyi KELLOGG, New Mallophaga, I, 1896, p. 87, pl. III, fig. 6.

From *Ptychoramphus aleuticus*, *Synthliboramphus antiquus*, and *Brachyramphus marmoratus* (all from the Bay of Monterey, California).

Docophorus atricolor KELLOGG, New Mallophaga, I, 1896, p. 93, pl. III, fig. 9.

From *Synthliboramphus antiquus* and *Brachyramphus marmoratus* (Bay of Monterey, California).

Docophorus procax KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 54, pl. V, fig. 1.

From *Cepphus columba* (Bay of Monterey, California).

Docophorus calvus KELLOGG, New Mallophaga, I, 1896, p. 79, pl. III, fig. 1.

From *Uria troile californica* (Bay of Monterey, California).

Docophorus lari DENNY, Monograph. Anoplur. Brit., 1842, p. 89, pl. v, fig. 9.—KELLOGG, New Mallophaga, I, 1896, p. 98, pl. IV, fig. 4.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 217.—KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 4.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 56.

Recorded by Kellogg from *Larus argentatus smithsonianus*, *L. canus*, *L. occidentalis*, *L. brachyrhynchus*, *L. glaucescens*, *L. heermanni*, *L. vegæ*, *L. delawarensis*, *L. glaucus*, and *Rissa tridactyla pollicaris* (all from Bay of Monterey, California); also from *L. delawarensis* (Lawrence, Kansas); *Larus* sp. (Baja California), and *L. glaucescens* (North Pacific Ocean, off Alaska); also males, females, and young, hence probably not stragglers, from *Colymbus nigricollis californicus* and *Urinator lumme* (Bay of Monterey, California). Recorded by Osborn from *Larus philadelphia* (Burnett collection) and from "herring gull" (Cassino collection).

Recorded by European authors from a dozen or more species of *Larus* (including some of the species listed above), and from *Lestris pomarinus* and *crespictatus*, *Sula alba*, *Tringa islandica* (probably mistaken determination), and *Brachyotus otus*.

Docophorus melanocephalus BURMEISTER, Handb. d. Ent., II, 1839, p. 426.—KELLOGG, New Mallophaga, I, 1896, p. 99, pl. IV, fig. 6.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 218.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 56.

Recorded by Kellogg from *Sterna maxima* (Bay of Monterey, California); by Osborn from "great Cayenne tern" (Burnett collection); by Kellogg and Chapman from *Stercorarius pomarinus* (Bay of Monterey, California).

Recorded by European authors from *Sterna caspia*, *S. cantiaca*, *S. bergi*, and *Larus ridibundus* and *L. cirrocephalus* (Paraguay).

Docophorus occidentalis KELLOGG, New Mallophaga, I, 1896, p. 89, pl. III, fig. 7.

From *Fulmarus glacialis glupischa* and *F. g. rodgersii*, and probably as a straggler, from *Oidemia perspicillata* (all hosts from Bay of Monterey, California).

Docophorus validus KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 56, pl. v, fig. 2.

From *Puffinus gavia* (Bay of Monterey, California).

Docophorus phaetonus OSBORN, Proc. U. S. Nat. Museum, 1889, XII, p. 189.

From *Phaeton aethereus* (Lower California or Panama).

Docophorus bassanae DENNY, Monograph. Anoplur. Brit., 1842, p. 110, pl. VI, fig. 3; pl. VII, fig. 3.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 217.

Recorded by Osborn; "host unknown, probably the gannett (Burnett collection)."

Recorded by European authors from *Sula bassana*, *Phalacrocorax carbo*, and *Sterna hirundo*.

Docophorus icterodes NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 290.—KELLOGG, New Mallophaga I, 1896, p. 96, pl. IV, fig. 1.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 217.—KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 4.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 58.

Recorded by Kellogg from *Oidemia perspicillata*, *Erismatura rubida*, and *Merganser serrator* (Bay of Monterey, California), and from *Anas boscas*, *Anas carolinensis*, *Aythya americana*, *Aythya affinis*, and *Dafila acuta* (Lawrence, Kansas), and from *Merganser serrator* (Kadiak Island, Alaska). Recorded by Osborn as "a very common species on many kinds of ducks. Specimens have been noted in the Cassino, Burnett, and Stejneger collections, and also taken at Ames, Iowa." Recorded by Kellogg and Chapman from *Aythya marila nearctica* and *Aythya affinis* (Palo Alto, California).

Recorded by European writers from *Mergus albellus*, *M. merganser*, *Anas rufina*, *A. boscas*, *A. fuligula*, *A. glacialis*, *A. albifrons*, *A. clypeata*, *A. crecca*, *A. stelleri*, *Fuligula marila*, *F. ferina*, and *Mareca penelope*. Recorded by Piaget as "sur toute espèce de canards." Piaget believes *Docophorus natatorum* Rudow,[1] from *Platypus glacialis*, *Bernicla torquata*, *Chenalopex aegypticus*, and *Anas fusca*, to be *D. icterodes*. He considers *D. adustus* Giebel,[2] from a domestic duck, *D. brevimaculatus* Giebel,[2] from *Anser albifrons*, and *D. brunneiceps* Giebel,[2] from *Anser cygnoides* as varieties merely of *D. icterodes*. Piaget also refers to a *Docophorus*, from *Podiceps cristatus*, as a variety of *icterodes*.

Docophorus cygni DENNY, Monograph. Anoplur. Brit., 1842, p. 95, pl. I, fig. 1.—OSBORN, Notes on Mallophaga and Pediculidæ, Canad. Ent., 1884, XVI, p. 197; Insects Affecting Domestic Animals, 1896, p. 217.

Recorded by Osborn from *Olor buccinator* (?) (Ames, Iowa).

Recorded by European authors from *Cygnus bewickii*, *C. musicus*, *Dendrocygna arborea*, and the "bean goose" (Denny, Great Britain).

Docophorus sphenophorus NITZSCH (ed. Giebel); Zeitschr. f. ges. Naturwiss., XXVIII, 1866, p. 310.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 217.

[1] Zeitschr. f. ges. Naturwiss., XXXV, 1870, p. 453.
[2] Insecta Epizoa, p. 113.

Recorded by Osborn from Cassino collection, "without indication of host or locality, but it is doubtless American, probably from spoonbill" (*Ajaja ajaja*).

Recorded by European authors from *Platalea leucorordia* and *Ibis religiosa*.

Docophorus bisignatus NITZSCH (ed. Giebel), Zeitschr. f. ges. Naturwiss., XXVIII, 1866, p. 362.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 217.

Recorded by Osborn from *Ibis* (*Guara*) *alba* (collection of C. B. Cook).

Recorded by Nitzsch-Giebel from *Ibis falcinellus*.

Docophorus quadraticeps KELLOGG, New Mallophaga, I, 1896, p. 85, pl. III, fig. 5.

From *Fulica americana* (Bay of Monterey, California).

Docophorus minuto-trabeculatus OSBORN, Insects Affecting Domestic Animals, 1896, p. 221.

From *Fulica americana* ("collected from a stuffed bird in the museum of the Iowa Agricultural College").

Docophorus pertusus NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 290.—KELLOGG, New Mallophaga, I, 1896, p. 97, pl. IV, figs. 2, 3.

Recorded by Kellogg from *Fulica americana* (Lawrence, Kansas, and Bay of Monterey, California); also from *Erismatura rubida* and *Colymbus nigricollis californicus* (Bay of Monterey, California).

Recorded by Nitzsch-Giebel from *Fulica atra* (probably Europe).

Docophorus fusiformis DENNY, Monograph. Anoplur. Brit., 1842, p. 84, pl. I, fig. 2.—OSBORN, Insects Affecting Domestic Animals, 1897, p. 217.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 58, pl. V, fig. 3.

Recorded by Osborn (a typographical error makes the species read "fissiformis") from "black-billed sandpiper" (Burnett collection). Recorded by Kellogg and Chapman from *Tringa minutilla* (Palo Alto, California).

Recorded by European authors from *Tringa minuta* and *T. subarquata*. Piaget believes *D. variabilis* Denny,[1] from *Tringa variabilis*, and *D. canuti* Denny,[2] from *Tringa canutus*, to be merely varieties of *fusiformis*.

Docophorus cordiceps GIEBEL, Insecta. Epizoa., 1874, p. 103.—KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. V, pl. 1, fig. 2.

Recorded by Kellogg from *Tringa macularia* (Panama) and *Tringa* sp. (Baja California).

Recorded by European authors from *Totanus glareola*, *T. maculatus*, *T. calidris*, *T. hypoleucos*, *T. fuscus*, *T. ochropus*, *Calidris aren-*

[1] Monograph. Anoplur. Brit., p. 71, pl. III, fig. 4.
[2] Idem, p. 84, pl. III, fig. 5.

aria, *Machetas pugnax*, *Strepsilas interpres*, *Charadrius hiaticula*. Denny also records it from *Lestris parasiticus* and *L. pomarinus*, and Grube from *Larus richardsoni* and *Larus fuscus*. I suspect that Denny and Grube have confounded *cordiceps* and *lari* here, especially as Grube records *lari* from *Tringa islandica*.

Docophorus testudinarius DENNY, Monograph. Anoplur. Brit., 1842, p. 96, pl. I, fig. 6.—OSBORN, Notes on Mallophaga and Pediculidæ, Canad. Ent., 1884, XVI, p. 197; Insects Affecting Domestic Animals, 1896, p. 217.

Recorded by Osborn from *Numenius longirostris* (Ames, Iowa) and from *Bartramia longicauda* (Burnett collection).

Recorded by European authors from *Numenius arquatus*.

Docophorus fuliginosus KELLOGG, New Mallophaga, I, 1896, p. 80, pl. III, fig. 2.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 59.

Recorded by Kellogg from *Charadrius squatarola* (Lawrence, Kansas, and Palo Alto, California); by Kellogg and Chapman from *Charadrius squatarola* and *Aegialitis semi-palmata* (Pacific Grove, California).

Docophorus platystomus NITZSCH, Burmeister, Handb. d. Ent., 1839, II, p. 426.—OSBORN, Notes on Mallophaga and Pediculidæ, Canad. Ent., 1884, XVI, p. 197; Insects Affecting Domestic Animals, 1896, p. 216.

Recorded by Osborn from *Accipiter velox* (Rhode Island), *Buteo Swainsoni* (Iowa?), and *Aquila imperialis* (Burnett collection).

Recorded by European authors from *Buteo vulgaris* and from "rough-legged buzzard" (Denny, Great Britain); also a variety by Piaget from *Haliastur indus*.

Docophorus buteonis PACKARD, American Naturalist, 1870, IV, p. 93, pl. I, fig. 3.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 218.

Recorded by Packard from *Buteo lineatus* (America); by Osborn from same host (probably Hanover, New Hampshire), and from *Tryannus atra* (Burnett collection).

Docophorus taurocephalus KELLOGG, New Mallophaga, II, 1896, p. 471, pl. LXV, fig. 1.

From *Archibuteo lagopus sancti-johannis* (Lawrence, Kansas).

Docophorus pictus GIEBEL, Insecta Epizoa, 1874, p. 74.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 59, pl. V, fig. 4.

Recorded by Kellogg and Chapman from *Aquila chrysætos* (Palo Alto, California). Recorded by Nitzsch-Giebel from same host.

Decophorus halieti OSBORN, Insects Affecting Domestic Animals, 1896, p. 218.

From *Haliætus leucocephalus* (Florida).

Docophorus rostratus NITZSCH, Burmeister, Handb. d. Ent., 1839, II, p. 427.—KELLOGG, New Mallophaga, II, 1896, p. 486, pl. LXVI, fig. 5.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 218.

Recorded by Kellogg from *Strix pratincola* (Soquel, California); by Osborn from same host, collection of Prof. Lawrence Bruner (Nebraska?).

Recorded by European authors from *Strix flammea*.

Docophorus cursor NITZSCH, Burmeister, Handb. d. Ent., 1839, II, p. 426.—OSBORN, Notes on Mallophaga and Pediculidæ, Canad. Ent., 1884, XVI, p. 197.—KELLOGG, New Mallophaga, II, 1896, p. 484, pl. LXVI, fig. 1.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 216.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 60.

Recorded by Ôsborn from *Otus vulgaris* var *wilsonii* (*Asio wilsonianus*) (Ames, Iowa, and Lincoln, Nebraska); by Kellogg from *Bubo virginianus* (Lawrence, Kansas), and by Kellogg and Chapman from *Asio wilsonianus* (Ontario, California).

Recorded by European authors from *Strix bubo*, *S. otus*, and *S. brachyotus*.

[**Docophorus syrnii** PACKARD, description?

In Gurlts "Neues Verzeichniss d. Thiere, auf welchen Schmarotzer-Insekten leben", Archiv f. Naturgeschichte, XLIV, No. 1, p. 185, "*Docophorus syrnii* Packard" is recorded as parasite of *Strix nebulosa*. Neither Osborn nor I have been able to find the original record for this species.]

Docophorus speotyti OSBORN, Insects Affecting Domestic Animals, 1896, p. 222, fig. 144.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 60.

Recorded by Osborn from *Speotyto cunicularia hypogæa* (Lincoln, Nebraska, and Fort Collins, Colorado); recorded by Kellogg and Chapman from *Syrnium nebulosum* (La Honda, California).

Docophorus bubonis OSBORN, Insects Affecting Domestic Animals, 1896, p. 219.

From *Bubo virginianus* (Pennsylvania).

Docophorus ceblebrachys NITZSCH, ed. Giebel, Zeitsch. f. ges. Naturwiss., 1861, XVII, p. 528.—KELLOGG, New Mallophaga, II, 1896, p. 485, pl. LXVI, fig. 3.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 216.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 61.

Recorded by Kellogg from *Nyctea nyctea* (Lawrence, Kansas); by Osborn from same host (Iowa and other localities in America); by Kellogg and Chapman from same host (Pullman, Washington).

Recorded by European authors from same host.

Docophorus coccygi OSBORN, Insects Affecting Domestic Animals, 1896, p. 222, fig. 143.

From "yellow-billed cuckoo" (*Coccyzus americanus*) (Lincoln, Nebraska).

Docophorus latifrons NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 290.—KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 5, pl. I, figs. 5 and 8.

From *Coccyzus californicus occidentalis* (Baja California).

Recorded by European authors from *Cuculus canorus* and in a single instance from *Yunx torquilla* (Denny, England).

Docophorus evagans KELLOGG, New Mallophaga, II, 1896, p. 480, pl. LXVI, fig. 2.

From *Dryobates pubescens* (Lawrence, Kansas).

Docophorus superciliosus NITZSCH, Burmeister, Handb. d. Ent., 1839, II, p. 427.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 216.

Recorded by Osborn from *Dryobates villosus* (Cassino collection) (North America).

Recorded by European authors from *Picus major* and *P. viridis*.

Docophorus singularis KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 61, pl. V, fig. 5.

From *Dryobates nuttalli* (Ione, California).

Docophorus californiensis KELLOGG, New Mallophaga, II, 1896, p. 483, pl. LXVI, fig. 6.—KELLOGG, Mallophaga from Birds of Panama, Baja California and Alaska, in New Mallophaga, III, 1899, p. 6.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 63.

Recorded by Kellogg from *Melanerpes formicivorous bairdii* (Palo Alto, California) and from *M. f. angustifrons* (Baja California); by Kellogg and Chapman from *Sphyrapicus thyroideus* (Eldorado County, California) and from *Xenopicus albolarvatus* (Eldorado County and Kings River Canyon, California).

Docophorus alienus KELLOGG, New Mallophaga, II, 1896, p. 473, pl. LXV, fig. 2.

From *Colaptes auratus* (Lawrence, Kansas).

Docophorus jungens KELLOGG, New Mallophaga, II, 1896, p. 481, pl. LXVI, fig. 4.

From *Colaptes auratus* (Lawrence, Kansas).

Docophorus rufus KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 7, pl. I, figs. 6 and 9.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 63.

Recorded by Kellogg from *Myiarchus cinerascens nuttingi* (Baja California); by Kellogg and Chapman from *Myiarchus cinerascens* (Ontario, and Alameda County, California).

Docophorus fusco-ventralis OSBORN, Insects Affecting Domestic Animals, 1896, p. 221.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 64.

Recorded by Osborn from *Contopus virens* (Cornell University collection, also Burnett collection) (North America); by Kellogg and Chapman from *Myiarchus cinerascens* (Palo Alto, California).

Docophorus distinctus KELLOGG, New Mallophaga, II, 1896, p. 477, pl. LXV, fig. 5.

From *Corvus corax sinuatus* (Colorado).

Docophorus corvi OSBORN, Insects Affecting Domestic Animals, 1896, p. 220, fig. 142.

From *Corvus americanus* (Ames, Iowa). "This is probably Packard's *Lipeurus corvi*, which was evidently described from an immature specimen" (Osborn).

Docophocus transpositus KELLOGG, New Mallophaga, II, 1896, p. 478, pl. LXV, fig. 6.

From *Molothrus ater* (Lawrence, Kansas).

Docophorus agelaii OSBORN, Insects Affecting Domestic Animals, 1896, p. 220.

From *Agelaius phœniceus* (North America).

Docophorus quiscali OSBORN, Insects Affecting Domestic Animals, 1896, p. 219, fig. 141.

From "crow blackbird" (*Quiscalus quiscula ?*) (Ames, Iowa).

Docophorus compar PIAGET, Les Pediculines, 1880, p. 61, pl. VII, fig. 1.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 217.

Recorded by Osborn from *Loxia curvirostra minor* (Ames, Iowa).

Recorded by Piaget from *Loxia curvirostra* (Museum of Leyden).

Docophorus hamatus PACKARD, American Naturalist, 1870, IV, p. 94, pl. I, fig. 7.

From *Emberiza* (*Plectrophenax*) *nivalis* (North America).

Docophorus mirinotatus KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 65, pl. V, fig. 6.

From *Junco hyemalis thurberi* (Kings River Canyon, California).

Docophorus communis NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 290.—KELLOGG, New Mallophaga, II, 1896, p. 486, pl. LXVI, fig. 7.—OSBORN, Insects Affecting Domestic Animals, 1897, p. 216.—KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 9.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 64.

Recorded by Kellogg from *Otocoris alpestris*, *Agelaius phœniceus*, *Sturnella magna neglecta*, *Calcarius lapponicus*, *Junco hyemalis*,

Cardinalis cardinalis, *Ampelis garrulus*, *Lanius ludovicianus excubitorides*, *Harporphynchus rufus*, and *Merula migratoria* (all from Lawrence, Kansas); *Icterus bullocki*, *Carpodacus purpureus californicus*, *Carpodacus mexicanus frontalis*, *Spinus pinus*, *Spinus psaltria*, and *Ammodramus sandvicensis* (all from Palo Alto, California); *Cardinalis cardinalis igneus* (Baja California). Recorded by Osborn from *Lanius borealis* (Ames, Iowa) and "shore lark" (*Otocoris* sp.) (Burnett collection). Recorded by Kellogg and Chapman from the following birds taken in California (in addition to specimens of several of the host species already listed): *Myiarchus cinerascens*, *Empidonax difficilis*, *Otocoris alpestris chrysolæma*, *Cyanocitta stelleri frontalis*, *Aphelocoma californica*, *Scolecophagus cyanocephalus*, *Chondestes grammacus strigatus*, *Zonotrichia leucophrys intermedia*, *Zonotrichia l. gambeli*, *Zonotrichia coronata*, *Spizella socialis arizonæ*, *Amphispiza belli*, *Melospiza fasciata samuelis*, *Pipilo fuscus crissalis*, *Habia melanocephala*, *Guiraca cærulea eurhyncha*, *Piranga ludoviciana*, *Ampelis cedrorum*, *Lanius borealis*, *Lanius ludovicianus gambeli*, *Vireo solitarius cassini*, *Dendroica æstiva*, *Thryothorus bewickii spilurus*, *Parus inornatus*, *Turdus aonalaschke auduboni*, *Sialia mexicana occidentalis*.

Recorded by European authors from many species of passerine birds.

Docophorus panamensis KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 9, pl. I. fig. 1.

From *Phœnicothrampis fuscicauda* (Panama).

Docophorus domesticus KELLOGG, New Mallophaga, II, 1896, p. 475, pl. LXV, fig. 4; Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 10.

From *Progne subis* (Lawrence, Kansas) and *Progne subis hesperus* (Baja California).

Docophorus excisus NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 290; var. *major* KELLOGG, New Mallophaga, II, 1896, p. 489.

Variety *major* recorded by Kellogg from *Petrochelidon lunifrons* and *Tachycineta bicolor* (Palo Alto, California, and Lawrence, Kansas).

Recorded by European authors from *Hirundo urbica*, *H. rustica*, *H. domestica*, *Cypselus apus*, and *Cotyle riparia*.

Docophorus laticeps GIEBEL, Insecta Epizoa, 1874, p. 88.—KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 11, pl. I, figs. 4 and 7.

Variety *americanus* recorded by KELLOGG from *Cinclus mexicanus* (Kodiak Island, Alaska).

The species recorded by European authors from *Cinclus aquaticus*.

Docophorus mirus KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 67, pl. v, fig. 7.

From *Thyrothorus bewickii spilurus* (Palo Alto, California).

Docophorus rutteri KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 12, pl. i. fig. 3.

From *Parus atricapillus occidentalis* (Kadiak Island, Alaska).

Docophorus sialii OSBORN, Insects Affecting Domestic Animals, 1896, p. 220.

From *Sialia sialis* (Merriam, Colorado).

Docophorus incisus KELLOGG, New Mallophaga, II, 1896, p. 474, pl. LXV, fig. 3.

From *Sialia sialis* (Lawrence, Kansas) and *Ampelis cedrorum* (Lawrence, Kansas).

Genus NIRMUS Nitzsch.

Nirmus NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 291.

Nirmus fuscomarginatus DENNY, Monog. Anoplur. Brit., 1842, p. 136, pl. x, fig. 1.—KELLOGG and CHAPMAN, var. *americanus*, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 69, pl. v, fig. 9.

Variety *americanus* recorded by Kellogg and Chapman from *Colymbus nigricollis californicus*, *Cepphus columba*, and *Larus argentatus smithsonianus* (straggler?), all hosts from Bay of Monterey, California.

The species is recorded by European authors from *Podiceps auritus* and *P. cristatus*.

Nirmus pacificus KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 70, pl. v, fig. 8.

From *Lunda cirrhata*, *Cepphus columba*, and *Puffinus griseus* (Bay of Monterey, California).

Nirmus maritimus KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 72, pl. VI, fig. 1.

From *Cerorhinca monocerata*, *Ptychoramphus aleuticus*, *Synthliboramphus antiquus*, and as straggler, probably, from *Fulmarus glacialis glupischa* (all from Bay of Monterey, California).

Nirmus citrinus NITZSCH (ed. Giebel), Zeitschr. f. ges. Naturwiss, 1866, XXVIII, p. 378.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 224.

Recorded by Osborn from *Synthliboramphus antiquus Simorhynchus cristatellus*, *Sim. pygmæus*, *Sim. pusillus* (Stejneger collection), and *Alleus* (*Alle*) *alle* (Cassino collection) (North America).

Recorded by European writers from *Alca torda*.

Nirmus triangulatus NITZSCH (ed. Giebel), Zeitschr. f. ges. Naturwiss, 1866, XXVIII, p. 378.—KELLOGG and CHAPMANN, Mallophaga from Birds of California, in New Mallophaga, III, 1897, p. 74, pl. VI, fig. 2.

Recorded by Kellogg and Chapman from *Stercorarius pomarinus* (Bay of Monterey, California).

Recorded by European authors from *Lestris crespidata*, *L. richardsoni*, *Stercorarius pomarinus*, and *Larus canus*.

Nirmus lineolatus NITZSCH (ed. Giebel), Zeitschr. f. ges. Naturwiss., 1866, XXVIII, p. 376.—KELLOGG, New Mallophaga, I, 1896, p. 113, pl. VI, figs. 7, 8, 9.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 224.—KELLOGG and CHAPMAN (var. *atrimarginatus*), Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 75.

Recorded by Kellogg from *Larus argentatus smithsonianus*, *L. brachyrhynchus*, *L. glaucescens*, *L. canus*, *L. vegæ*, *L. occidentalis*, *L. heermani*, *L. californicus*, and *L. delawarensis* (all from Bay of Monterey, California). Recorded by Osborn from "herring gull, in collection of S. E. Cassino; Baker collection, Elkhart, Indiana."

Recorded by European authors from *Larus canus*, *L. argentatus*, *L. glaucus*, and *L. tridactylus*.

Variety *atrimarginatus* Kellogg and Chapman, recorded by Kellogg and Chapman from *Larus canus*, *L. vegæ*, *L. brachyrhynchus*, and *Rissa tridactyla pollicaris*.

Nirmus punctatus NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 291.—KELLOGG, New Mallophaga, I, 1896, p. 109, pl. VI, figs. 1 and 2; Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 13.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 75.

Recorded by Kellogg from *Larus occidentalis* (Bay of Monterey, California) and *Larus* sp. (Baja California); by Kellogg and Chapman from *Larus delawarensis* (Bay of Monterey, California).

Recorded by European authors from *Larus ridibundus*, *L. dominicanus* (Chile), *L. crassirostris* (China), and *L. ichthyætos* (Valgas).

Nirmus felix GIEBEL, Insecta Epizoa, 1874, p. 175.—KELLOGG, New Mallophaga, I, 1896, p. 110, pl. VI, figs. 3, 4.

Recorded by Kellogg from *Larus heermani* (Bay of Monterey, California).

Recorded bp European authors from same host.

Nirmus præstans KELLOGG, New Mallophaga, I, 1896, p. 99, pl. V, figs. 1, 2.

From *Sterna maxima* (Bay of Monterey, California).

Nirmus hebes KELLOGG, New Mallophaga, I, 1896, p. 101, pl. V, fig. 3.

From *Sterna maxima* (Bay of Monterey, California).

Nirmus giganticola KELLOGG, New Mallophaga, I, 1896, p. 105, pl. v, fig. 6.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 75.

From *Diomedea albatrus* (Bay of Monterey, California).

Nirmus furvus NITZSCH (ed. Giebel), Zeitschr. f. ges. Naturwiss., 1866, XXVIII, p. 374.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 225.—KELLOGG (var. *ravus* Kellogg), Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1897, p. 14, pl. II, fig. 1.

Recorded by Osborn from *Phalaropus tricolor* (Museum, Iowa Agricultural College).

Recorded by European authors from several species of *Totanus* and from godwits and plovers. The species is not sufficiently sharply defined to list accurately its hosts.

Var. *ravus* Kellogg from *Actitis macularia* (Panama).

Nirmus piceus NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 291.

N. pileus N., KELLOGG, New Mallophaga, I, 1896, p. 113, pl. VI, fig. 6.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 224.

Recorded by Kellogg from *Recurvirostra americana* (Lawrence, Kansas); by Osborn from same host (Museum, Iowa Agricultural College).

Recorded by European authors from *Recurvirostra avocetta*. The specific name *pileus* has been used for this form ever since the first reference after Nitzsch, evidently from mere carelessness.

Nirmus signatus PIAGET, Les Pédiculines, 1880, p. 186, pl. XV, fig. 8.—KELLOGG, New Mallophaga, I, 1896, p. 112, pl. VI, fig. 5.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 224.

Recorded by Kellogg from *Recurvirostra americana* (Lawrence, Kansas); by OSBORN from same host, "collected from stuffed bird in museum of Iowa Agricultural College."

Recorded by European authors from *Recurvirostra avocetta*.

Nirmus fissus NITZSCH, Germar's Mag. Ent., 1818, III, p. 291.—KELLOGG, var. *major* Kellogg, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 15, pl. II, fig. 2.

Variety *major* Kellogg, from *Tringa* sp. (Baja California). The species (under name *bicuspis*) is recorded by European authors from *Charadrius minor*, *Ch. hiaticula*, *Ch. morinellus*, *Totanus calidris*, *Recurvirostra avocetta*, and *Vanellus cristatus*.

Nirmus complexivus KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 75, pl. VI, fig. 3.

From *Calidris arenaria* (Pacific Grove, California) and *Tringa minutilla* (Palo Alto, California).

Nirmus actophilus KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 78, pl. VI, fig. 4.

From *Calidris arenaria* (Pacific Grove, California).

Nirmus cordatus OSBORN, Insects Affecting Domestic Animals, 1896, p. 228, pl. II, fig. *a*.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 80.

Recorded by Osborn from *Limosa hæmastica* (Burnett collection) (North America); by Kellogg and Chapman from *Limosa fedoa* (Bay of Monterey, California).

Nirmus incoenis KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 81, pl. VI, fig. 5.

From *Charadrius squatarola* (Pacific Grove, California).

Nirmus orarius KELLOGG, New Mallophaga, I, 1896, p. 104, pl. V, fig. 5.

From *Charadrius dominicus* (Lawrence, Kansas).

Nirmus opacus KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 83, pl. VI, fig. 6.

From *Ægialitis semipalmata* (Pacific Grove, California).

Nirmus parallelus OSBORN, Insects Affecting Domestic Animals, 1896, p. 229, pl. II, fig. *d*.

From *Ægialitis vocifera* (Burnett collection) (North America).

Nirmus boephilus KELLOGG, New Mallophaga, I, 1896, p. 107, pl. V, fig. 7.

From *Ægialitis vocifera* (Lawrence, Kansas).

Nirmus abruptus OSBORN, Insects Affecting Domestic Animals, 1896, p. 229, pl. II, fig. *c*.

From *Colinus virginianus* (Burnett collection) (North America).

Nirmus fuscus NITZSCH (ed. Giebel), Zeitschr. f. ges. Naturwiss., 1861, XVII, pp. 523–525.—OSBORN, Notes on Mallophaga and Pediculidæ. Canad. Ent., XVI, 1884, p. 197.—KELLOGG, New Mallophaga, II, 1896, p. 499, pl. LXVII, fig. 7.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 223.—KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 15.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 85.

Recorded by Osborn from *Buteo swainsoni* (Ames, Iowa), and *Accipiter velox* "(Merriam)". Recorded by Kellogg from *Buteo swainsoni*, *Circus hudsonius*, and *Archibuteo lagopus sancti-johannis* (all from Lawrence, Kansas); and from *Falco sparverius peninsularis*, *F. peregrinus anatum*, and *Buteo borealis lucusanus* (all from Baja California); also from *Falco sparverius* (Panama). Recorded by Kellogg and Chapman from *Falco sparverius deserticola*, *Buteo borealis calurus*, and *Elanus leucurus* (Palo Alto, California), and from *Accipiter atricapillus striatatus* (Pullman, Washington).

Recorded by European authors from many species of hawks, kites, and eagles (*Milvus*, *Buteo*, *Falco*, *Circus*, *Aquila*, and *Archibuteo*.

Nirmus discocephalus NITZSCH, Germar's Mag. Ent., 1818, III, p. 291.—KELLOGG (var. *amblys* Kellogg) New Mallophaga, II, 1897, p. 498, pl. LXVII, fig. 6.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 223.

Variety *amblys* Kellogg, from *Haliætus leucocephalus* (Lawrence, Kansas). Recorded by Osborn from same host (Burnett collection) (North America).

Recorded by European authors from *Haliætus albicella*.

Nirmus splendidus KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 16, pl. II, figs. 3 and 6.

From *Polyborus cheriway* (Baja California).

Nirmus fenestratus NITZSCH (ed. Giebel), Zeitschr. f. ges. Naturwiss., 1866, XXVII, p. 117.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 224.

Recorded by Osborn from *Coccyzus erythrophthalmus* (Burnett collection) (North America).

Recorded by European authors from *Cuculus canorus*.

Nirmus atopus KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 18, pl. II, fig. 4.

From *Piaya cayana thermophila* (Panama).

Nirmus marginatus OSBORN, Insects Affecting Domestic Animals, 1896, p. 228, pl. II, fig. *b*.

From *Ceophlæus pileatus* (Burnett collection) (North America).

Nirmus candidus NITZSCH (ed. Giebel), Zeitschr. f. ges. Naturwiss., 1866, XXVII, p. 117; XXVIII, p. 368.—OSBORN, Notes on Mallophaga and Pediculidæ, Canad. Ent., 1884, XVI, p. 198; Insects Affecting Domestic Animals, 1896, p. 224.

Recorded by Osborn from *Melanerpes carolinus* (Burnett collection), *Colaptes auratus*, and *Picus villosus* (locality?).

Recorded by European authors from *Picus canus* and *P. viridis*.

Nirmus eustigmus KELLOGG, New Mallophaga, II, 1896, p. 493, pl. LXVII, fig. 3.

From *Trochilus annæ* (Palo Alto, California).

Nirmus tyrannus OSBORN, Insects Affecting Domestic Animals, 1896, p. 228.

From *Tyrannus* sp. (Burnett collection).

Nirmus vulgatus KELLOGG, New Mallophaga, II, 1896, p. 496, pl. LXVII, fig. 5.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 86.

Recorded by Kellogg from *Carpodacus purpureus californicus*, *C. mexicanus frontalis*, *Zonotrichia coronata*, *Z. gambeli*, *Pipilo maculatus megalonyx*, and *Pipilo fuscus crissalis* (all from Palo Alto, California); and from *Junco hyemalis* and *Merula migratoria* (Law-

rence, Kansas). Recorded by Kellogg and Chapman from (in addition to several hosts already listed) *Guiraca cærulea*, *Chondestes grammacus strigatus*, *Passerina amœna*, *Parus gambeli*, *Parus rufescens neglectus*, *Sialia mexicanus occidentalis*, *Dendroica æstiva*, *Helminthophila celata lutescens*, *Trochilus alexandri*, *Cyanocitta stelleri frontalis*, *Cinclus mexicanus*, *Empidonax difficilis*, and *Myiarchus cinerascens* (all from California).

Nirmus fœdus KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 87, pl. VI, fig. 7.

From *Myiarchus cinerascens*, *Sayornis saya*, *Tyrannus verticalis*, *Icteria virens longicauda*, *Lanius ludovicianus gambeli*, and *Phainopepla nitens* (all from Ontario, California).

Nirmus ductilis KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 89, pl. VI, fig. 8.

From *Empidonax difficilis* (Ontario, California).

Nirmus rotundatus OSBORN, Insects Affecting Domestic Animals, 1896, p. 226.

From *Corvus americanus* (Ames, Iowa.)

Nirmus secondarius OSBORN, Insects Affecting Domestic Animals, 1896, p. 227.

From *Corvus americanus* (Ames, Iowa).

Nirmus ornatissimus GIEBEL, Insecta Epizoa, 1874, p. 144.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 224 (var. *xanthocephali* Osborn) (loc. cit.).

Recorded by Osborn from *Agelaius phœniceus* (Cassino collection); var. *xanthocephali* Osborn from *Xanthocephalus xanthocephalus* (Fairfax, Iowa).

Recorded by European authors from *Agelaius phœnicurus*.

Nirmus illustris KELLOGG, New Mallophaga, II, 1896, p. 494, pl. LXVII, fig. 4.

From *Agelaius phœniceus* (Lawrence, Kansas).

Nirmus virgatus KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 19, pl. II, fig. 5.

From *Amblycercus holosericeus* (Panama).

Nirmus picturatus OSBORN, Insects Affecting Domestic Animals, 1896, p. 226.

From *Sturnella magna* (Ames, Iowa).

Nirmus cyclothorax NITZSCH (ed. Giebel), Zeitschr. f. ges. Naturwiss., 1866, XXVII, p. 117.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 224.

From *Passer domesticus* (Laurent collection) and *Acanthis linaria* (?) (C. B. Cook collection).

Nirmus thoracicus PACKARD, Amer. Naturalist, 1870, IV, p. 94, pl. I, fig. 5.

From *Plectrophenax nivalis* (North America).

Nirmus lautiusculus KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 90, pl. VI, fig. 9.

From *Amphispiza belli* (Ontario, California).

Nirmus pallidus OSBORN, Insects Affecting Domestic Animals, 1896, p. 227.

From *Habia ludoviciana* (Ames, Iowa).

Nirmus gracilis NITZSCH, Germar's Mag. Ent., 1818, III, p. 291.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 225.

Recorded by Osborn from *Progne subis* (Ames, Iowa).

Recorded by European authors from *Hirundo urbica*.

Nirmus longus KELLOGG, New Mallophaga, II, 1896, p. 490, pl. LXVII, fig. 1.—KELLOGG and CHAPMAN, var. *domesticus* Kellogg and Chapman, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 92.

Recorded by Kellogg from *Petrochelidon lunifrons* (Palo Alto, California) and *Tachycineta bicolor* (Lawrence, Kansas). Variety, *domesticus* Kellogg and Chapman from *Chelidon erythrogaster* (Palo Alto, California).

Nirmus brachythorax GIEBEL, Insecta Epizoa, 1874, p. 134.—OSBORN, Notes on Mallophaga and Pediculidæ, Canad. Ent., 1884, XVI, p. 198; Insects Affecting Domestic Animals, 1896, p. 223.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 93.

Recorded by Osborn from *Ampelis garrulus* (locality?) and *Ampelis cedrorum* (Ames, Iowa); by Kellogg and Chapman from *Ampelis cedrorum* (Palo Alto, California).

Recorded by European authors from *Ampelis garrulus* and *A. carolinensis*.

Nirmus peninsularis KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 21, pl. II, fig. 9.

From *Phainopepla nitens* (Baja California).

Nirmus interpositus KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 23, pl. II, fig. 7.

From *Dendroica æstiva* (Panama).

Nirmus orpheus OSBORN, Insects Affecting Domestic Animals, 1896, p. 227.

From *Galeoscoptes carolinensis* (Burnett collection).

Nirmus audax KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 25, pl. II, fig. 8.

From *Psaltriparus flaviceps* (Baja California).

Nirmus simplex KELLOGG, New Mallophaga, II, 1896, p. 492, pl. LXVII, fig. 2.

From *Merula migratoria* (Lawrence, Kansas).

Genus LIPEURUS Nitzsch.

Lipeurus NITZSCH, Germar's Mag. d. Ent. 1818, III, p. 292.

Lipeurus laculatus KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 93, pl. VIII, fig. 1.

From *Stercorius pomarinus* and *Puffinus creatopus* (Bay of Monterey, California).

Lipeurus ferox GIEBEL, Zeitschr. f. ges. Naturwiss., 1867, XXIX, p. 195.—KELLOGG, New Mallophaga, I, 1896, p. 127, pl. IX, figs. 1, 2.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 97.

Lipeurus diomedea F. OSBORN, Proc. U. S. Nat. Mus., 1880, XII, p. 189.

Recorded by Kellogg from *Diomedea albatrus* (Bay of Monterey, California). Recorded by Osborn from *Diomedea brachyura* (locality?).

Recorded by European authors from *Diomedea exulans*, *D. melanophrys*, and *D. brachyura*.

Lipeurus densus KELLOGG, New Mallophaga, I, 1896, p. 114, pl. VII, figs. 1, 2; Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 28, pl. III, fig. 2.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 96.

Recorded by Kellogg from *Diomedea albatrus* (Bay of Monterey, California)? and from *D. nigripes* (North Pacific Ocean, off Alaska).

Lipeurus confidens KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 26, pl. III, fig. 1.

From *Diomedea nigripes* (North Pacific Ocean, off Alaska).

Lipeurus concinnus KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 97, pl. VII, fig. 2.

From *Diomedea albatrus* (Bay of Monterey, California).

Lipeurus varius KELLOGG, New Mallophaga, I, 1896, p. 116, pl. VII, figs. 3, 4.

From *Fulmarus glacialis glupischa* and *F. g. rodgersii* (Bay of Monterey, California).

Lipeurus celer KELLOGG, New Mallophaga, I, 1896, p. 117, pl. VII, figs. 5, 6.

From *Fulmarus glacialus glupischa* and *F. g. rodgersii* (Bay of Monterey, California).

Lipeurus diversus KELLOGG, New Mallophaga, I, 1896, p. 123, pl. VIII, figs. 3, 4.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 95.

Recorded by Kellogg from *Puffinus gavia* (Bay of Monterey, California); by Kellogg and Chapman, from *Puffinus gavia*, *P. griseus*, *P. creatopus*, *P. bulleri*, *P. tenuirostris*, and stragglers probably from *Diomedea albatrus* (all from Bay of Monterey, California).

Lipeurus testaceus TASCHENBERG, Die Mallophagen, 1882, p. 135, pl. v, fig. 3.—KELLOGG, New Mallophaga, I, 1896, p. 130, pl. xi, figs. 2, 4.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 100.

Recorded by Kellogg from *Puffinus gavia* (Bay of Monterey, California); by Kellogg and Chapman from *P. creatopus*.

Recorded by Taschenberg from *Procellaria capensis*.

Lipeurus limitatus KELLOGG, New Mallophaga, I, 1896, p. 124, pl. viii, figs. 5, 6.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 100.

Recorded by Kellogg from *Puffinus griseus* (Bay of Monterey, California); by Kellogg and Chapman from *Puffinus gavia*, *P. griseus*, *P. bulleri*, and *P. tenuirostris* (Bay of Monterey, California).

Lipeurus fuliginosus TASCHENBERG, Die Mallophagen, 1882, p. 156, pl. iv, fig. 3.—KELLOGG and CHAPMAN (var. *major*, Kellogg and Chapman), Mallophaga from Birds of California, in New Mallophaga, III, 1897, p. 100, pl. vii, fig. 3.

Variety *major* Kellogg and Chapman from *Puffinus gavia* and *P. creatopus* (Bay of Monterey, California). The species recorded by Taschenberg from *Diomedea exulans* and *D. chlororhyncha*.

Lipeurus subangusticeps PIAGET, Les Pédiculines, 1880, p. 308, pl. xxv, fig. 5.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 235, pl. ii, fig. *g*.

Recorded by Osborn from "*Thalassidroma wilsoni*" (*Oceanites oceanicus?*) (Burnett collection).

Recorded by European authors from *Thalassidroma leachi* and *Th. pelagica*.

Lipeurus pullatus NITZSCH (ed. Giebel), Zeitschr. f. ges. Naturwiss., 1866, xxviii, p. 387.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 234.

Recorded by Osborn from *Sula bassana* and *Sula alba* (Burnett collection).

Lipeurus faralloni KELLOGG (Nirmus), New Mallophaga, I, 1896, p. 103, pl. v, fig. 4.—KELLOGG and CHAPMAN (Lipeurus), Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 101, pl. vii, fig. 4.

Recorded by Kellogg from *Phalacrocorax dilophus albociliatus*, and a straggler, probably, from *Colymbus septentrionalis* (Bay of Monterey, California); by Kellogg and Chapman, from *Phalacrocorax penicillatus* (Bay of Monterey, California).

Lipeurus longicornis PIAGET, Les Pédiculines, 1880, p. 334, pl. xxvii, fig. 3.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 233.

Recorded by Osborn from *Phalacrocorax dilophus* (Ames, Iowa).

Recorded by European authors from *Phalacrocorax carbo* and *Ph. cristatus*. A straggler, probably, recorded by Denny from *Hæmatopus ostralegus*.

Lipeurus toxoceros NITZSCH (ed. Giebel), Zeitschr. f. ges. Naturwiss., 1866, XXVIII, p. 386.—KELLOGG, New Mallophaga, I, 1896, p. 131, pl. X, figs 3 and 5.

Recorded by Kellogg from *Phalacrocorax dilophus albociliatus*, and a straggler, probably, from *Pelecanus californicus;* both hosts from Bay of Monterey, California.

Lipeurus forficulatus NITZSCH (ed. Giebel), Zeitschr. f. ges. Naturwiss., 1866, XXVIII, p. 386.—KELLOGG, New Mallophaga, I, 1896, p. 129, pl. IX, figs. 3–6.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 233.—KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 30.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 102.

Recorded by Kellogg from *Pelecanus californicus* (Bay of Monterey, California, and Baja California) and from *Pelecanus erythrorhynchus* (Lawrence, Kansas); by Osborn from "pelican" (*P. erythrorhynchus?*) (Ames, Iowa).

Recorded by European authors from *P. onocrotalus.*

Lipeurus bifasciatus PIAGET, Les Pédiculines, 1880, p. 342, pl. XXVIII, fig. 1.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 233.

Recorded by Osborn from *Pelecanus erythrorhynchus* (Davenport, Nebraska).

Recorded by Piaget from *P. crispus.*

Lipeurus gracilicornis PIAGET, Les Pédiculines, 1880, p. 309, pl. XXV, fig. 6.—KELLOGG (var. *major* K.), Mallophaga from Birds of Panama, Baja California, and Alaska, in new Mallophaga, III, 1899, p 30, pl. III, fig. 3.

Variety *major* Kellogg from *Fregata aquila.* The species recorded by Piaget from *Fregata minor.*

Lipeurus temporalis NITZSCH, Germar's Mag. Ent., 1818, III, p. 292.—KELLOGG, New Mallophaga, I, 1896, p. 130, pl. X, fig. 1.

Recorded by Kellogg from *Merganser serrator* (Bay of Monterey, California).

Recorded by European authors from *Mergus merganser* and *M. serrator.*

Lipeurus squalidus NITZSCH, Germar's Mag. Ent., 1818, III, p. 292.—OSBORN, Notes on Mallophaga and Pediculidæ, Canad. Ent., 1884, XVI, p. 198.—OSBORN, The Pediculi and Mallophaga Affecting Man and the Lower Animals, 1891, p. 39, fig. 27.—KELLOGG, New Mallophaga, I, 1896, p. 132, pl. X, figs. 6, 7.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 233.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 102.

Recorded by Osborn from *Anas boschas* (locality?), *Merganser serrator* (Cassino collection), *Eniconetta stelleri* (Stejneger collec-

tion); by Kellogg from *Anas boschas*, *Charitonetta albeola*, *Erismatura rubida* (all Lawrence, Kansas); by Kellogg and Chapman from *Spatula clypeata* (Palo Alto, California).

Recorded by European authors from numerous species of *Anas*, *Fuligula*, *Oidemia*, and (varieties) from *Cygnus*.

Lipeurus constrictus KELLOGG, New Mallophaga, I, 1896, p. 125, pl. VIII, figs. 7, 8.

From *Oidemia perspicillata* (Bay of Monterey, California, and Lawrence, Kansas) and *O. deglandi* (Bay of Monterey, California).

Lipeurus jejunus NITZSCH, Germar's Mag. Ent., 1818, III, p. 292.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 234.

Recorded by Osborn from *Anser albifrons gambeli* (Cook collection).

Recorded by European authors from several species of *Anser*.

Lipeurus leucopygus NITSCH, Burmeister, Handb. d. Ent., 1839, II, p. 434.—Var. *fasciata* PIAGET, Les Pédiculines, 1880, p. 320.—Var. *fasciatus* PIAGET, OSBORN, Insects Affecting Domestic Animals, 1896, p. 234.

Variety *fasciata* PIAGET, recorded by Osborn from *Botaurus* sp. (Burnett collection). This variety recorded by Piaget from *Ardea stellaris*.

Lipeurus botauri OSBORN, Insects Affecting Domestic Animals, 1896, p. 234.

From *Botaurus lentiginosus* (locality?).

Lipeurus luridus NITZSCH, Germar's Mag. Ent., 1818, III, p. 292.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 232.

Recorded by Osborn from *Fulica americana* (locality?).

Lipeurus longipilus KELLOGG, New Mallophaga, I, 1896, p. 119, pl. VII, fig. 7.

From *Fulica americana* (Pacific Grove, California).

Lipeurus picturatus KELLOGG, New Mallophaga, I, 1896, p. 121, pl. VIII, figs. 1, 2.

From *Fulica americana* (Lawrence, Kansas).

Lipeurus infuscatus OSBORN, Insects Affecting Domestic Animals, 1896, p. 234, pl. II, figs. *e*, *f*.

From *Philohela minor* and *Bartramia longicauda* (Burnett collection).

Lipeurus dissimilis PIAGET, Les Pédiculines, 1880, p. 359, pl. XXIX, fig. 1.—KELLOGG, New Mallophaga, II, 1896, p. 507, pl. LXVIII, fig. 7.

Recorded by Kellogg from *Colinus virginianus* (Lawrence, Kansas).

Recorded by Piaget from same host (Zoological Garden of Rotterdam).

Lipeurus docophoroides PIAGET, Les Pédiculines, 1880, p. 357, pl. XXVIII, fig. 9.—KELLOGG, New Mallophaga, II, 1896, p. 508, pl. LXVIII, fig. 8.—Var. *californicus* KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 103.

Recorded by Kellogg from *Callipepla californica* (Mountain View, California).

Recorded by Piaget from same host species (Zoological Garden of Rotterdam). Variety *californicus* Kellogg and Chapman from *Oreortyx pictus plumifrons* (El Dorado County, California).

Lipeurus perplexus KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 103, pl. VII, fig. 5.

From *Dendragapus obscurus fuliginosus* (Kings River Canyon, California) and *Pediocætes phasianellus columbianus* (Pullman, Washington).

Lipeurus protervus KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 31, pl. III, fig. 4.

From *Lagopus lagopus* (Kadiak Island, Alaska).

Lipeurus polytrapezius NITZSCH, Germar's Mag. Ent., 1818, III, p. 293.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 234.

Recorded by Osborn from *Meleagris gallopavo*.

Recorded by European authors from the same host.

Lipeurus introductus KELLOGG, New Mallophaga, II, 1896, p. 500, pl. LXVIII, figs. 1, 5.

From *Phasianus nycthemerus* (bird store, San Francisco, California).

Lipeurus variabilis NITZSCH, Osborn, Insects Affecting Domestic Animals, 1896, p. 234.

"A common species on domestic fowls" (Osborn).

Lipeurus heterographus NITZSCH, Osborn, Insects Affecting Domestic Animals, 1896, p. 231.

Goniocotes burnetti PACKARD, Amer. Nat., 1870, IV, p. 94, fig. 116.

Recorded by Packard from "common barnyard fowl;" by Osborn from "domestic fowl" (Burnett collection, and Ames, Iowa); also from "young duck" (Lincoln, Nebraska (?)).

Lipeurus baculus NITZSCH, Germar's Mag. Ent., 1818, III, p. 293.—OSBORN, Notes on Mallophaga and Pendiculidæ, Canad. Ent., 1884, XVI, p. 198.—KELLOGG, New Mallophaga, II, 1896, p. 506, pl. LXVIII, figs. 4, 6.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 232.

Recorded by Osborn from domestic pigeons (several collections); by Kellogg from same host (*Columba livia*), (Lawrence, Kansas).

[Lipeurus pustulatus? OSBORN, Insects Affecting Domestic Animals, 1896, p. 234.

From *Haliætus leucocephalus* (Burnett collection). I can find no

description of this species and no other reference to it. Osborn's brief reference does not give the name of the describer, nor any reference to any previous record of the species; on the other hand, he does not give a description of the form. Can it be that Osborn has meant to refer to *quadri-pustulatus* Nitzsch recorded by European authors from *Aquila chrysætos* and *A. albicilla?*]

Lipeurus macgregori KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 33, pl. III, figs. 5, 6.

From *Crotophaga sulcirostris* (Panama).

Lipeurus macrocephalus KELLOGG, New Mallophaga, II, 1896, p. 504, pl. LXVIII, fig. 3.

From *Chordeiles virginianus henryi* (Palo Alto, California).

Lipeurus snodgrassi KELLOGG, New Mallophaga, II, 1896, p. 502, pl. LXVIII, fig. 2.

From *Trochilus rufus* (Palo Alto, California).

Lipeurus corvi PACKARD, Amer. Nat., 1870, IV, p. 95, pl. I, fig. 2.

From the crow (*Corvus americanus?*) (locality?).

Lipeurus gracilis PACKARD, Amer. Nat., 1870, IV, p. 95, pl. I, fig. 6.

No host; no locality.

Lipeurus elongatus PACKARD, Amer. Nat., 1870, IV, p. 95, pl. I, figs. 4, 4*a*.

No host; no locality.

Genus GIEBELIA Kellogg.

Giebelia KELLOGG, New Mallophaga, I, 1896, p. 137.

Giebelia mirabilis KELLOGG, New Mallophaga, I, 1896, p. 138, pl. XI, figs. 7, 8.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 105.

Recorded by Kellogg from *Puffinus gavia* (Bay of Monterey); by Kellogg and Chapman from *Puffinus griseus*, *P. creatopus*, *P. tenuirostris*, *P. bulleri*, and probably a straggler, from *Diomedea albatrus* (all from Bay of Monterey, California).

Genus EURYMETOPUS Taschenberg.

Eurymetopus TASCHENBERG, Die Mallophagen, 1882, p. 182.

Eurymetopus brevis DUFOUR, Ann. Soc. Ent. France, 1835, IV, p. 674, pl. XXXI, fig. 3.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 233.

Lipeurus taurus NITZSCH, OSBORN, Proc. U. S. Nat. Mus., 1889, p. 188.

Eurymetopus taurus NITZSCH, KELLOGG, New Mallophaga, I, 1896, p. 135, pl. XI, figs. 3-6.—KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 35.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 109.

Recorded by Osborn from *Diomedea exulans* (*Albatross* expedi-

tion); by Kellogg from *Diomedea albatrus* (Bay of Monterey, California), *Diomedea nigripes* (North Pacific Ocean, off Alaska), and, as a straggler, probably, from *Fulmarus glacialis glupischa* and *F. g. rodgersii* (Bay of Monterey, California); recorded by Kellogg and Chapman, as a straggler, probably, from *Puffinus gavia* (Bay of Monterey, California).

Recorded by European authors from *Diomedea exulans*, *D. nigripes*, and *D. brachyura*.

Genus ORNITHOBIUS Denny.

Ornithobius DENNY, Monograph. Anoplur. Brit., 1842, p. 183.

Ornithobius goniopleurus DENNY, Monograph. Anoplur. Brit., 1842, p. 184, pl. XXIII, fig. 2.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 236.

Recorded by Osborn from *Branta canadensis* (Burnett collection).

Recorded by Denny from *Cygnus canadensis* and from *Mergus merganser* (Great Britain).

Ornithobius cygni LINNÆUS (Pediculus), Syst. Nat., 1759, II, p. 1018.—OSBORN, The Pediculi and Mallophaga Affecting Man and the Lower Animals, 1891, p. 42, fig. 30; Insects Affecting Domestic Animals, 1896, p. 236.

Ornithobius bucephalus GIEBEL, OSBORN, Notes on Mallophaga and Pediculidæ, Canad. Ent., 1884, XVI, p. 198.

Recorded by Osborn from *Olor buccinator* (Ames, Iowa).

Recorded by European authors from *Cygnus musicus* and *C. olor*.

Genus ONCOPHORUS Rudow.

Oncophorus RUDOW, Zeitschr. f. ges. Naturwiss., 1870, XXXV, p. 175.

Oncophorus bisetosus PIAGET, Les Pédiculines, 1880, p. 217, pl. XVIII, fig. 4.—Var. *californicus* KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 106, pl. VII, fig. 6.

Variety *californicus* Kellogg and Chapman, from *Rallus obsoletus* and *R. virginianus* (Palo Alto, California).

Variety *porzanæ* Piaget, from *Porzana noveboracensis* (specimen from North America in Museum of Leyden).

The species is recorded by Piaget from *Rallina plumbeiventris*, *R. tricolor*, and *R. isabellina*.

Oncophorus minutus NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 291 (Philopterus).—OSBORN, Notes on Mallophaga and Pediculidæ, Canad. Ent., 1884, XVI, p. 198; Insects Affecting Domestic Animals, 1896, p. 230.

Recorded by Osborn from *Fulica americana* (Ames, Iowa).

Recorded by European authors from *Fulica atra*, *Gallinula chloropus*, *G. orientalis*, and *G. hæmatopus*.

Oncophorus advena KELLOGG, New Mallophaga, I, 1896, p. 133, pl. XI, figs. 1, 2.

From *Fulica americana*, and *Urinator pacificus* (Bay of Monterey, California).

Oncophorus remotus KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 107, pl. VII, fig. 7.

From *Scotiaptex cinerea* (Pullman, Washington).

Genus GONIOCOTES Burmeister.

Goniocotes BURMEISTER, Handb. d. Entomologie, 1839, II, p. 431.

Goniocotes creber KELLOGG, New Mallophaga, II, 1896, p. 510, pl. LXIX, fig. 3.

From *Phasianus nycthemerus* (bird store, San Francisco, California).

Goniocotes compar NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 294.—KELLOGG, New Mallophaga, II, 1896, p. 512, pl. LXIX, fig. 4.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 230.

Recorded by Kellogg from *Columba livia* (Lawrence, Kansas); by Osborn from same host (Burnett collection).

Genus GONIODES Nitzsch.

Goniodes NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 293.

Goniodes ortygis PIAGET, Les Pédiculines, 1880, p. 282, pl. XXIII, fig. 6.

From *Ortyx virginianus* (specimens from North America, in the Zoological Garden of Rotterdam).

Goniodes dispar NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 294.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 230.

Recorded by Osborn from quail (*Ortyx virginianus?*) (Cassino collection).

Recorded by European authors from *Perdix cinerea*.

Goniodes mammillatus RUDOW, Zeitschr. f. ges. Naturwiss., 1870, XXXV, p. 483.—KELLOGG, New Mallophaga, II, 1896, p. 509, pl. LXIX, fig. 2; Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 35.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 109.

Recorded by Kellogg from *Callipepla californica* (Mountain View, California), and from *Lagopus lagopus* (Kadiak Island, Alaska) by Kellogg and Chapman from *Pediocætes phasianellus columbianus* (Pullman, Washington). Described by Rudow from *Pelecanus ruficollis* (must have been an instance of straggling) and recorded by Taschenberg from *Callipepla californica*.

Goniodes cupido GIEBEL, Zeitschr. f. ges. Naturwiss., 1866, XXVIII, p. 387.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 231.

Recorded by Osborn from *Tympanuchus americanus* (C. B. Cook collection).

Recorded by European authors from *Tetrao cupido*.

Goniodes merriamanus PACKARD, Rept. U. S. Geol. and Geog. Survey, 1872, p. 731.

From *Tetrao richardsoni* (no locality).

Goniodes stylifer NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 294.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 231.

Recorded by Osborn from *Meleagris gallopavo* (Hassall, Baltimore, Maryland).

Recorded by European authors from same host.

Goniodes cervinicornis GIEBEL, Insecta Epizoa, 1874, p. 199.—KELLOGG, New Mallophaga, II, 1896, p. 509, pl. LXIX, fig. 1.

Recorded by Kellogg from *Phasianus nycthemerus* (bird store, San Francisco, California).

Recorded by European authors from same host and *Tragopan satyrus*.

Goniodes damicornis NITZSCH (ed. Giebel), Zeitschr. f. ges. Naturwiss., 1866, XXVII, p. 119.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 231.

Recorded by Osborn from the "pigeon" (*Columba livia*) (Cassino collection).

Recorded by European authors from *Columba palumbus*.

Goniodes falcicornis NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 293.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 231.

Recorded by Osborn as "common on the pea-fowl."

Recorded by European authors from *Pavo cristatus*.

[**Goniodes mephitidis** PACKARD, Rept. U. S. Geol. and Geog. Survey, 1872, p. 732.

Taken from a skunk, *Mephitis*, but probably a straggler from some gallinaceous bird which was the prey of the animal.]

Family TRICHODECTIDÆ Burmeister.

Genus TRICHODECTES Nitzsch.

Trichodectes NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 294.

Trichodectes scalaris NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 296.—OSBORN, The Pediculi and Mallophaga Affecting Man and the Lower Animals, Bull. 7, Div. of Ent., U. S. Dept. Ag., 1891, p. 47, fig. 36; Insects Affecting Domestic Animals, 1896, p. 238.

From domestic cattle.

Trichodectes parumpilosus PIAGET, Les Pédiculines, 1880, p. 397, pl. XXXII, fig. 5.—OSBORN, The Pediculi and Mallophaga, 1891, p. 46, fig. 35; Insects Affecting Domestic Animals, 1896, p. 238.

From the horse (Ames, Iowa).

Trichodectes climax NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 296.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 237.

From the domestic goat (Hassall collection, Baltimore).

Trichodectes sphærocephalus NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 296.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 237.
From domestic sheep (Canada and Iowa).

Trichodectes limbatus GERVAIS, Aptères, III, 1844, p. 313, pl. VII, fig. 1.—OSBORN, Insects Affecting Domestic Animals, 1896, p 237.
From domestic goat (Hassall collection, Baltimore).

Trichodectes subrostratus NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 296.—OSBORN, The Pediculi and Mallophaga, 1891, p. 42, fig. 31; Insects Affecting Domestic Animals, 1896, p. 237.
From domestic cat ("Fitch and other American collections").

Trichodectes retusus NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 296.—OSBORN, Notes on Mallophaga and Pediculidæ, Canad. Ent., 1884, XVI, p. 98; Insects Affecting Domestic Animals, 1896, p. 237.
From *Putorius ermineus* (locality?) and the weasel (Ames, Iowa.)

Trichodectes setosus GIEBEL, Zeitschr. f. ges. Naturwiss., 1861, XVII, p. 86.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 239, fig. 145.
From the porcupine *Erethizon dorsatum* (Nebraska).

Trichodectes crassus NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 295.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 237.
From *Procyon lotor* (Burnett collection).

Trichodectes geomydis OSBORN, The Pediculi and Mallophaga, 1891, p. 54, fig. 42; Insects Affecting Domestic Animals, 1896, p. 239, fig. 146.
From *Geomys bursarius* (Ames, Iowa) and *Thomomys bottæ* (California).

Trichodectes parallelus OSBORN, Insects Affecting Domestic Animals, 1896, p. 240, fig. 148.
From the "deer" (species?) (Cornell collection).

Trichodectes tibialis OSBORN, Insects Affecting Domestic Animals, 1896, p. 240, fig. 147.
From black-tailed deer (Baker collection).

Trichodectes castoris OSBORN, Insects Affecting Domestic Animals, 1896, p. 241, fig. 149.
From the beaver (locality?).

Trichodectes mephitidis OSBORN, Insects Affecting Domestic Animals, 1896, p. 242, fig. 150.
From polecat, *Spilogale interrupta* (Tama County, Iowa), and from *Mephitis mephitica* (Nebraska and California).

Trichodectes quadraticeps CHAPMAN, Entomological News, 1897, VIII, p. 185, pl. IX.
From the fox, *Urocyon virginianus* (Palo Alto, California).

Trichodectes californicus CHAPMAN, Entomological News, 1897, VIII, p. 186, pl. IX.
From the pocket mouse, *Perognathus* sp. (Baja California).

Suborder AMBLYCERA Kellogg.

Family LIOTHEIDÆ Burmeister.

Genus LÆMOBOTHRIUM Nitzsch.

Læmobothrium NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 301.

Læmobothrium similis KELLOGG, New Mallophaga I, 1896, p. 153, pl. XIV, figs. 1, 2.
From *Colymbus nigricollis californicus* (Lawrence, Kansas).

Læmobothrium atrum NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 302.—KELLOGG, New Mallophaga I, 1896, p. 155, pl. XIV, fig. 3.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 247.
Recorded by Kellogg from *Fulica americana* (Bay of Monterey, California); by Osborn from unknown host.
Recorded by European authors from *Fulica atra* and *Podiceps rubricollis*.

Læmobothrium hasticeps NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 302.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 247.
Osborn's specimens (by typographical error referred to as *hastipes*) were sent him by Dr. C. Hart Merriam; host and locality unindicated by Osborn.
Recorded by European authors from *Falco tinnunculus*.

Læmobothrium giganteum NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 301.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 247.
Recorded by Osborn from *Thrysætos harpyia* (Beutenmüller).
Recorded by European authors from *Buteo vulgaris*.

Genus PHYSOSTOMUM Nitzsch.

Physostomum NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 302.

Physostomum invadens KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga III, 1899, p. 50.
From *Melanerpes wagleri* and *Chiroxiphia lanceolata* (Panama).

Physostomum lineatum OSBORN, Insects Affecting Domestic Animals, 1896, p. 248.
From *Trochilus colubris* (Cornell University collection).

Physostomum prominens KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 137, pl. IX, fig. 5.
From *Colypte costæ* (Ontario, California).

Physostomum angulatum KELLOGG, New Mallophaga, II, 1896, p. 515, pl. LXX, fig. 5.
From *Tyrannus tyrannus* (Lawrence, Kansas).

Physostomum sucinaceum KELLOGG, New Mallophaga II, 1896, p. 514, pl. LXX, fig. 2.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 137.
From *Empidonax difficilis* (Palo Alto, California).

Physostomum diffusum KELLOGG, New Mallophaga, II, 1896, p. 518, pl. LXX, fig. 3; var. *pallidum* KELLOGG, Idem, p. 519.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga III, 1899, p. 137.

Recorded by Kellogg from *Zonotrichia coronata* and *Passerculus sandvicensis* (Palo Alto, California); by Kellogg and Chapman from *Junco hyemalis oregonus* (Pullman, Washington). Variety *pallidum* Kellogg, from *Junco* sp. (Lawrence, Kansas).

Physostomum microcephalum KELLOGG, New Mallophaga, II, 1896, p. 513, pl. LXX, fig. 1.

From *Carpodacus mexicanus frontalis* (Palo Alto, California).

Physostomum australe KELLOGG, New Mallophaga, II, 1896, p. 516, pl. LXX, fig. 4.

From *Passerina versicolor* (Cameron County, Texas).

Physostomum pallens KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 49, pl. IV, fig. 7.

From *Protonotaria citrea* and *Elainea subpagana* (Panama).

Physostomum frenatum NITZSCH, Burmeister, Handb. d. Ent., 1839, II, p. 442.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 248.

Recorded by Osborn from "golden-crowned Kinglet" (*Regulus satrapa*) (Laurent collection). "Very similar forms from *Passerella iliaca* (Cassino collection), and *Pipilo erythrophthalmus*, from Dr. Merriam" (Osborn).

Recorded by Nitzsch from *Regulus verus*.

Genus TRINOTON Nitzsch.

Trinotoñ NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 300.

Trinoton luridum NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 300.—OSBORN, Notes on Mallophaga and Pediculidæ, Canad. Ent., 1884, XVI, p. 199.—KELLOGG, New Mallophaga, I, 1896, p. 152, pl. XIII, fig. 4.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 248.—KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 35.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 116.

Recorded by Osborn from *Anas boschas;* "have met with it a number of times myself, and have noted it in collections of the U. S. National Museum, the Cassino collection, from *Mergus serrator*, Bruner collection, Kellogg collection, etc." (Osborn).

Recorded by Kellogg from *Spatula clypeata*, *Merganser serrator*, *Anas carolinensis*, *Dafila acuta*, *Anas boscas*, and *Anas americana* (Lawrence, Kansas); from *Erismatura rubida* (Monterey, California), and from *Anas carolinensis* (Kadiak Island, Alaska).

Recorded by Kellogg and Chapman from *Anas americana* and *Aythya marila nearctica* (Palo Alto, California), and from *Spatula clypeata* (Mountain View, California).

Recorded by European authors from numerous species of *Anas* and from other ducks; and also from *Branta rufina* and *Egretta alba*.

Trinoton lituratum NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 300.—KELLOGG, New Mallophaga, I, 1896, p. 151, pl. XIII, fig. 3.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 248.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 116.

Recorded by Kellogg from *Dafila acuta* and *Merganser serrator* (Lawrence, Kansas); by Osborn from "blue-winged teal" (Cassino collection); by Kellogg and Chapman from *Spatula clypeata* (Mountain View, California).

Recorded by European authors from *Mergus albellus*, *Anas clypeata*, *Dendrocygna arborea*, and *Anser albifrons*.

Trinoton minor OSBORN, Insects Affecting Domestic Animals, 1896, p. 248.

From *Oidemia* sp. (Burnett collection).

Genus ANCISTRONA Westwood.

Ancistrona WESTWOOD, Thesaurus Entomologicus Oxoniensis, 1874, p. 197.

Ancistrona gigas PIAGET, Les Pédiculines, Supplement, 1885, p. 117, pl. XII, fig. 8.—KELLOGG, New Mallophaga, I, 1896, p. 150, pl. XIII, figs. 1, 2.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 116.

Recorded by Kellogg from *Fulmarus glacialis glupischa* and *F. g. rodgersii*, and by Kellogg and Chapman from *Puffinus gavia*, and *P. griseus* (all hosts from Bay of Monterey, California).

Recorded by Piaget from *Procellaria glacialis*.

Genus NITZSCHIA Denny.

Nitzschia DENNY, Monograph. Anoplur. Brit., 1842, p. 230.

Nitzschia pulicaris NITZSCH, Zeitschr. f. ges. Naturwiss., 1861, XVIII, p. 304.—OSBORN, Notes on Mallophaga and Pediculidæ, Canad. Ent., 1884, XVI, p. 199; Insects Affecting Domestic Animals, 1896, p. 247.

Recorded by Osborn from *Chætura pelasgica* (Ames, Iowa).

Recorded by European authors from *Cypselus apus*.

Nitzschia dubius KELLOGG, New Mallophaga, II, 1896, p. 540, pl. LXXIII, fig. 6.

From *Chætura pelasgica* (Lawrence, Kansas).

Genus COLPOCEPHALUM Nitzsch.

Colpocephalum NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 298.

Colpocephalum perplanus KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 109, pl. VII, fig. 8.

From *Lunda cirrhata* (Bay of Monterey, California).

Colpocephalum funebre KELLOGG, New Mallophaga, I, 1896, p. 147, pl. XII, fig. 7.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1897, p. 111.

Recorded by Kellogg from *Larus glaucescens* (Bay of Monterey, California); by Kellogg and Chapman from *L. heermanni* (Bay of Monterey, California).

Colpocephalum lari PACKARD, American Naturalist, 1870, IV, p. 96, pl. I, fig. 1.

From *Larus marinus* (locality?).

Colpocephalum abbotti KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 36, pl. IV, fig. 9.

From *Larus* sp. (Baja California).

Colpocephalum fuscipes PIAGET, Les Pédiculines, 1880, p. 567, pl. XLVII, fig. 7.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 246.

Recorded by Osborn from *Larus* sp. (Cassino collection).

Recorded by Piaget from *Larus dominicanus*.

Colpocephalum pingue KELLOGG, New Mallophaga, I, 1896, p. 144, pl. XII, fig. 5.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 111.

From *Diomedea albatrus* (Bay of Monterey, California).

Colpocephalum unciferum KELLOGG, New Mallophaga, I, 1896, p. 140, pl. XII, figs. 1–3.

From *Pelecanus erythrorhynchus* (Lawrence, Kansas) and *P. californicus* (Bay of Monterey, California).

Colpocephalum spineum KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 38, pl. IV, fig. 1.

From *Fregata aquila* (Panama).

Colpocephalum laticeps KELLOGG, New Mallophaga, I, 1896, p. 149, pl. XII, fig. 8.

From *Ardea egretta* (Lawrence, Kansas).

Colpocephalum assimile PIAGET, Les Pédiculines, 1880, p. 544.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 246.

Recorded by Osborn from Ames, Iowa (Osborn collection), host not specifically given, but by implication *Grus americana;* also from "whooping crane" (*Grus americana*) (Lamar, Colorado).

Recorded by Piaget from *Grus americana* (Zoological Garden of Rotterdam).

Colpocephalum uniforme KELLOGG, New Mallophaga, I, 1896, p. 142, pl. XII, fig. 4.

From *Recurvirostra americana* (Lawrence, Kansas).

Colpocephalum ochraceum NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 299.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 246.

Recorded by Osborn from *Tringa maculata* (Burnett collection).

Recorded by European authors from *Vanellus cristatus*, *V. varius*, *Himantopus rufipes*, *Charadrius morinellus*, *Tringa variabilis*, *Limosa rufa*, *Macrorhamphus griseus*, *Charadrius hiaticula*, *Totanus hypoleucus*, *Hæmatopus ostralegus*, and *Sterna minuta*.

Colpocephalum spinulosum PIAGET, Les Pédiculines, 1880, p. 563, pl. XLVII, fig. 3; var. *minor* KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 112, pl. VII, fig. 9.

Variety *minor* Kellogg and Chapman, from *Calidris arenaria* (Pacific Grove, California).

The species recorded by Piaget from *Limosa melanura*.

Colpocephalum timidum KELLOGG, New Mallophaga, I, 1896, p. 145, pl. XII, fig. 6.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 112.

Recorded by Kellogg from *Charadrius dominicus* (Lawrence, Kansas); by Kellogg and Chapman from *C. squatarola* (Pacific Grove, California).

Colpocephalum longicaudum PIAGET, Les Pédiculines, 1880, p. 534, pl. XLIV, fig. 6.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 246.

Recorded by Osborn from "carrier pigeon" (Burnett collection). "Also a specimen very similar on *Gallus gallus* (Burnett collection)" (Osborn).

Recorded by Piaget from *Columba domestica* and "probablement comme deserteur" from *Phasianus reevesii*.

Colpocephalum flavescens NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 298.—OSBORN, Notes on Mallophaga and Pediculidæ, Canad. Ent., 1884, XVI, p. 198.—KELLOGG, New Mallophaga, II, 1896, p. 525, pl. LXXI, fig. 4.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 246.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 113.

Recorded by Osborn from *Elanoides forficatus* (Ames, Iowa); by Kellogg from *Archibuteo lagopus sancti-johannis* and *Haliætus leucocephalus* (Lawrence, Kansas); by Kellogg and Chapman from *Aquila chrysætos* (Palo Alto, California), and *Haliætus pelagicus* (brought to California from Arctic Ocean).

Recorded by European authors from *Haliætus albicilla*, *H. leucogaster*, *Aquila nævia Gypætos barbatus*, *Harpyia destructor*, *Milvus regalis*, *Astur palumbarius*, *Falco peregrinus*, *Pernis apivorus*, *Buteo vulgaris*, *Circus cinereus*, and *Nyctea nivea*.

Colpocephalum osborni KELLOGG, New Mallophaga, II, 1896, p. 521, pl. LXXI, figs. 2 and 3.

From *Elanus leucurus* (Palo Alto, California).

Colpocephalum maculatum PIAGET, Les Pédiculines, 1880, p. 516, pl. XLIII, fig. 1.—KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 40, pl. IV, fig. 2.

Recorded by Kellogg from *Polyborus cheriway* (Baja California).

Recorded by Piaget from *Polyborus brasiliensis* (Zoological Garden of Rotterdam).

Colpocephalum subpachygaster PIAGET, Les Pédiculines, 1880, p. 517, pl. XLIII, fig. 2.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 246.

Recorded by Osborn from *Bubo virginianus* (Burnett collection).

Recorded by Piaget from *Strix noctua*, *S. flammea*, and *S. passerina*.

Colpocephalum pustolusum PIAGET, Les Pédiculines, 1880, p. 559, pl. XLVI, fig. 8.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 246.

Recorded by Osborn from *Ceryle alcyon* (Burnett collection).

Recorded by Piaget from *Machetes pugnax*.

Colpocephalum subæquale NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 299.—KELLOGG, New Mallophaga, II, 1896, p. 525, pl. LXXII, fig. 1; Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 40.

Recorded by Kellogg from *Corvus americanus* (Palo Alto, California) and *Corvus corax sinuatus* (Baja California).

Recorded by European authors from *Corvus corax*, *C. frugilegus*, and *C. corone*.

Colpocephalum chrysophæum KELLOGG, New Mallophaga, II, 1896, p. 520, pl. LXXI, fig. 1.

From *Melospiza fasciata samuelis* (Palo Alto, California).

Colpocephalum grandiculum KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 113, pl. VII, fig. 10.

From *Pipilo fuscus crissalis* (Palo Alto, California).

Colpocephalum diffusum KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 40, pl. IV, figs. 3, 4.

Recorded by Kellogg from *Amblycercus holosericeus*, *Arremonops striaticeps*, *Saltator albicollis*, *Phœnicothraupis fuscicauda*, *Elainea subpagana*, *Dendroica vieilloti*, *Piaya cayana thermophila*, *Chiroxiphia lanceolata*, and *Butorides virescens*.

Colpocephalum fumidum KELLOGG, New Mallophaga, II, 1896, p. 523, pl. LXXI, fig. 5.

From *Psaltriparus minimus* (Palo Alto, California).

Genus MENOPON Nitzsch.

Menopon NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 299.

Menopon tridens NITZSCH, Burmeister, Handb. d. Ent., 1839, II, p. 440.—KELLOGG, New Mallophaga, I, 1896 (varieties *pacificum* Kellogg, *insolens* Kellogg, and *par* Kellogg), p. 165, pl. XV, figs. 3, 4.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 244.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 116.

Recorded by Kellogg, variety *pacificum* Kellogg, from *Urinator pacificus* and *Fulica americana* (Monterey, California); variety *insolens* Kellogg from *Colymbus nigricollis californicus* (Bay of Monterey, California); and *Sterna forsteri* (Lawrence, Kansas), variety *par* Kellogg, from *Aechmophorus occidentalis* (Lawrence, Kansas).

Recorded by Osborn from *Fulica americana* (Ames, Iowa). Recorded by Kellogg and Chapman from *Rallus obsoletus* and *R. virginianus* (Palo Alto, California).

Menopon infrequens KELLOGG, New Mallophaga, I, 1896, p. 161, pl. XV, fig. 5.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 117.

Recorded by Kellogg from *Larus glaucescens* (Bay of Monterey, California), by Kellogg and Chapman from *L. delawarensis* (same locality).

Menopon navigans KELLOGG, New Mallophaga, I, 1896, p. 156, pl. XIV, figs. 4, 5.

From *Diomedea albatrus* (Bay of Monterey, California).

Menopon irrumpens KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 117, pl. VIII, fig. 1.

From *Diomedea albatrus* (Bay of Monterey, California).

Menopon numerosum KELLOGG, New Mallophaga, I, 1896, p. 159, pl. XV, fig. 1.

From *Fulmarus glacialis glupischa* and *F. g. rodgersii* (Bay of Monterey, California).

Menopon paululum KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 119, pl. VIII, fig. 2.

From *Puffinus gavia*, *P. griseus*, and *P. creatopus* (Bay of Monterey, California).

Menopon petulans KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 121, pl. VIII, fig. 3.

From *Puffinus gavia* and *P. griseus* (Bay of Monterey, California).

Menopon titan PIAGET, Les Pédiculines, 1880, p. 503, pl. XL, fig. 7.—KELLOGG, New Mallophaga, I, 1896 (varieties *impar* Kellogg and *linearis* Kellogg) p. 163, pl. XV, fig. 2.—KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899 (variety *linearis* Kellogg) p. 43.—KELLOGG and CHAP-

MAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899 (varieties *linearis* Kellogg and *incompositum* Kellogg and Chapman), p. 123.

Recorded by Kellogg, variety *impar* Kellogg from *Pelecanus erythrorhynchus* (Lawrence, Kansas); variety *linearis* Kellogg from *Pelecanus californicus* (Bay of Monterey, California, and Baja California); by Kellogg and Chapman, variety *incompositum* Kellogg and Chapman from *Phalacrocorax penicillatus* (Bay of Monterey, California).

Menopon consanguineum PIAGET, Les Pédiculines, Supplement, 1885, p. 116, pl. XII, fig. 7.—RILEY and HOWARD, Insect Life, 1893, V, p. 284.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 243.

Recorded by Riley and Howard from "white pelican" (Riverdale, California); by Osborn from "pelican" (*Pelecanus erythrorhynchus*) (Ames, Iowa), and on "specimens examined in collections of United States National Museum, Kansas University, Boston Society of Natural History, etc."

Menopon aurifasciatum KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 43, pl. IV, fig. 5.

From *Fregata aquila* (Panama).

Menopon loomisii KELLOGG, New Mallophaga, I, 1896, p. 162, pl. XV, fig. 6.

From *Oidemia deglandi* (Bay of Monterey, California).

Menopon indistinctum KELLOGG, New Mallophaga, I, 1896, p. 157, pl. XIV, figs. 6, 7.

From *Recurvirostra americana* (Lawrence, Kansas).

Menopon crocatum NITZSCH, ed. Giebel, Zeitschr. f. ges. Naturwiss., 1866, XXVIII, p. 392.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 244.

Recorded by Osborn from *Philohela minor* and *Limosa hæmastica* (Burnett collection).

Recorded by Nitzsch from *Numenius arquata*.

Menopon pallescens NITZSCH, ed. Giebel, Zeitschr. f. ges. Naturwiss., 1866, XXVIII, p. 391.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 243.

Recorded by Osborn from *Colinus virginianus* (Burnett collection).

Recorded by European authors from *Perdix cinerea*.

Menopon striatum KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 44, pl. IV, fig. 6.

From *Lagopus lagopus* (Kadiak Island, Alaska).

Menopon monostœchum KELLOGG, New Mallophaga, II, 1896, p. 530, pl. LXXII, fig. 4.

From *Phasianus nycthemerus* (bird store, San Francisco, California).

Menopon pallidum NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 299.—OSBORN, Notes on Mallophaga and Pediculidæ, Canad. Ent., 1884, XVI, p. 198; Insects Affecting Domestic Animals, 1896, p. 243.

Recorded by Osborn from the domestic fowl.

Recorded by European authors from the domestic fowl, pigeons, and ducks.

Menopon biseriatim PIAGET, Les Pédiculines, 1880, p. 469, pl. XXXVII, fig. 2.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 243.

Recorded by Osborn from domestic fowl (Baltimore; Cornell University collection).

Recorded by Piaget from domestic fowl, *Euplocamus cuvieri*, *Phasianus colchicus*, *Pavo speciferus*, and *Meleagris gallopavo*.

Menopon longicephalum KELLOGG, New Mallophaga, II, 1896, p. 535, pl. LXXIII, fig. 4.

From the pigeon, *Columba livia* (Lawrence, Kansas).

Menopon decoratum KELLOGG, New Mallophaga, II, 1896, p. 526, pl. LXXII, fig. 2.

From *Elanus leucurus* (Palo Alto, California).

Menopon fulvo-fasciatum PIAGET, Les Pédiculines, 1880, p. 417, pl. XXXIII, fig. 3.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 244.

Recorded by Osborn from *Milvus* sp. incog. (Burnett collection).

Recorded by Piaget from *Buteo vulgaris*, and a variety, *minor*, from *Accipiter nisus*.

Menopon funereum KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 124, pl. VIII, fig. 6.

From *Dryobates pubescens gairdneri* and *Coccothraustes vespertinus montanus* (California).

Menopon præcursor KELLOGG, Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III, 1899, p. 46, pl. IV, fig. 8.

From *Melanerpes uropygialis* (Baja California).

Menopon distinctum KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 126, pl. VIII, fig. 7.

From *Myiarchus cinerascens* and *Heleodytes brunneicapillus* (Ontario, California).

Menopon persignatum KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 128, pl. IX, fig. 1.

From *Aphelocoma californica* (Mountain View, California).

Menopon interruptus OSBORN, Insects Affecting Domestic Animals, 1896, p. 245, pl. II, fig. *h*.

From *Corvus americanus* (Ames, Iowa; also Burnett collection).

Menopon mesoleucum NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 300.—KELLOGG, var. *americanum* Kellogg, New Mallophaga, II, 1896, p. 539, pl. LXXIII, fig. 3.

Variety *americanum* Kellogg from *Corvus americanus* (Lawrence, Kansas, and Palo Alto, California).

The species recorded by European authors from *Corvus cornix* and *C. corone*.

Menopon expansum OSBORN, Insects Affecting Domestic Animals, 1896, p. 245, pl. II, fig. *j*.

From *Dolichonyx oryzivorus* (Burnett collection).

Menopon crassipes PIAGET, Les Pédiculines, 1880, p. 450, pl. XXXV, fig. 7.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 244.

Recorded by Osborn from *Icterus galbula* (Burnett collection).

Recorded by Piaget from *Epimachus magnificus*.

Menopon carduelis DENNY, Monograph. Anoplur. Brit., 1842, p. 2 8, pl. XX, fig. 7.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 244.

Recorded by Osborn from *Spinus tristis* (Burnett collection).

Recorded by Denny from *Fringilla carduelis*.

Menopon mœstum KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 130, pl. IX, fig. 2.

From *Zonotrichia coronata* and *Melospiza fasciata samuelis* (Palo Alto, California).

Menopon melanorum KELLOGG, New Mallophaga, II, 1896, p. 532, pl. LXXIII, fig. 1.

From *Pipilo erythrophthalmus* (Lawrence, Kansas).

Menopon dissimile KELLOGG, New Mallophaga, II, 1896, p. 536, pl. LXXIII, fig. 5.

From *Progne subis* (Lawrence, Kansas).

Menopon rusticum GIEBEL, Insecta Epizoa, 1874, p. 288.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 243.

Recorded by Osborn from *Progne subis* (Ames, Iowa).

Recorded by Giebel from *Hirundo rustica*.

Menopon malleus NITZSCH, Germar's Mag. d. Ent., 1818 (Eureum), III, p. 301.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 133, pl. IX, fig. 3.

Recorded by Kellogg and Chapman from *Petrochelidon lunifrons* (Ontario, California).

Recorded by European authors from *Hirundo rustica*.

Menopon ridulosum KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 135, pl. IX, fig. 4.

From *Dendroica æstiva* (Palo Alto, California).

Menopon robustum KELLOGG, New Mallophaga, II, 1896, p. 528, pl. LXXII, fig. 3.

From *Psaltriparus minimus* (Palo Alto, California).

Menopon incertum KELLOGG, New Mallophaga, II, 1896, p. 533, pl. LXXIII, fig. 2.—KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 130.

Recorded by Kellogg from *Turdus ustulatus* and *Spinus tristis* (Palo Alto, California); by Kellogg and Chapman from *Chondestes grammacus strigatus* (Ontario, California), and *Thryothorus bewicki spilurus* (Palo Alto, California).

Menopon fusco-marginatus OSBORN, Insects Affecting Domestic Animals, 1896, p. 245.

From *Turdus minor* (Burnett collection).

Genus GYROPUS Nitzsch.

Gyropus NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 302.

Gyropus ovalis NITZSCH, Germars Mag. f. Ent., 1818, III, p. 304.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 216, and p. 249, fig. 140.

Recorded by Osborn from guinea pig (*Cavia sobaya*) (Baltimore).

Recorded by European authors from same host, which is its only one.

Gyropus gracilis NITZSCH, Germar's Mag. d. Ent., 1818, III, p. 304.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 215, and p. 249, fig. 139.

Recorded by Osborn from guinea pig (*Cavia sobaya*) (Baltimore).

Reported by European authors from same host, which is its only one.

SUMMARY.

So far 282 species of Mallophaga have been recorded from North American hosts, of which 264 species are from birds and 18 from mammals. These species of Mallophaga represent 18 out of the 21 recognized genera. All of these genera except one (*Giebelia*) were established for specimens taken from European hosts. Of the 264 species of Mallophaga from North American birds, 107 are species originally described from European hosts (in 11 cases the American specimens being called varieties). The remaining 157 species were described from American hosts.

LIST OF HOSTS, WITH PARASITES.

BIRDS.

The sequence and nomenclature of hosts is, where possible, that of the American Ornithologists' Union Check-list of North American Birds, second edition, 1895; where the hosts have been recorded under names not recognized by the Check-list I have, where the synonymy

could certainly be made out, used the Check-list name. In cases of doubtful records or references to vernacular names only of host, I have indicated the doubt by a preceding point of interrogation and have given exact reference to the record in following parentheses:

Æchmophorus occidentalis.

Menopon tridens Nitzsch, var. *par* Kellogg.

Colymbus nigricollis californicus.

Docophorus pertusus Nitzsch.
lari Denny.
kansensis Kellogg.
Nirmus fuscomarginatus Denny, var. *americanus* Kellogg and Chapman.
Laemobothrium similis Kellogg.
Menopon tridens Nitzsch, var. *insolens* Kellogg.

Urinator pacificus.

Docophorus colymbinus Denny.
graviceps Kellogg.
Oncophorus adrena Kellogg.
Menopon tridens Nitzsch, var. *pacificum* Kellogg.

Urinator lumme.

Docophorus colymbinus Denny.
lari Denny.
Lipeurus faralloni Kellogg. (Straggler?)

Lunda cirrhata.

Nirmus pacificus Kellogg and Chapman.
Colpocephalum perplanum Kellogg and Chapman.

Cerorhinca monocerata.

Docophorus acutipectus Kellogg.
Nirmus maritimus Kellogg and Chapman.

Ptychoramphus aleuticus.

Docophorus insolitus Kellogg.
montereyi Kellogg.
Nirmus maritimus Kellogg and Chapman.

Simorhynchus cristatellus.

Nirmus citrinus Nitzsch.

Simorhynchus pygmæus.

Nirmus citrinus Nitzsch.

Simorhynchus pusillus.

Nirmus citrinus Nitzsch.

Synthliboramphus antiquus.

Docophorus atricolor Kellogg.
montereyi Kellogg.
Nirmus citrinus Nitzsch.
maritimus Kellogg and Chapman.

Brachyramphus marmoratus.

Docophorus atricolor Kellogg.
montereyi Kellogg.

Cepphus columba.

Docophorus procax Kellogg.
Nirmus fuscomarginatus Denny, var. *americanus* Kellogg and Chapman.
pacificus Kellogg and Chapman

Uria troile californica.

Docophorus calvus Kellogg.

Alle alle.

Nirmus citrinus Nitzsch.

Stercorarius pomarinus.

Docophorus melanocephalus Burmeister.
Nirmus triangulatus Nitzsch.
Lipeurus laculatus Kellogg and Chapman.

Rissa tridactyla pollicaris.

Docophorus lari Denny.
Nirmus lineolatus Nitzsch, var. *atrimarginatus* Kellogg and Chapman.

Larus glaucus.

Docophorus lari Denny.

Larus glaucescens.

Docophorus lari Denny.
Nirmus lineolatus Nitzsch.
Colpocephalum funebre Kellogg
Menopon infrequens Kellogg.

Larus marinus.

Colpocephalum lari Packard.

Larus occidentalis.

Docophorus lari Denny.
Nirmus lineolatus Nitzsch.
punctatus Nitzsch.

Larus argentatus smithsonianus.

Docophorus lari Denny.
Nirmus fuscomarginatus Denny, var. *americanus* Kellogg and Chapman.
lineolatus Nitzsch.

Larus vegæ.

Docophorus lari Denny.
Nirmus lineolatus Nitzsch.
lineolatus Nitzsch, var. *atrimarginatus* Kellogg and Chapman.

Larus californicus.

Nirmus lineolatus Nitzsch.

Larus delawarensis.
Docophorus lari Denny.
Nirmus lineolatus Nitzsch.
punctatus Nitzsch.
Menopon infrequens Kellogg.

Larus brachyrhynchus.
Docophorus lari Denny.
Nirmus lineolatus Nitzsch.
lineolatus Nitzsch, var. *atrimarginatus* Kellogg and Chapman.

Larus canus.
Docophorus lari Denny.
Nirmus lineolatus Nitzsch.
lineolatus Nitzsch, var. *atrimarginatus* Kellogg and Chapman.

Larus heermanni.
Docophorus lari Denny.
Nirmus felix Giebel.
lineolatus Nitzsch.
Colpocephalum funebre Kellogg.

Larus philadelphia.
Docophorus lari Denny.

Larus sp.
Colpocephalum abbotti Kellogg.

Larus sp. (Osborn, Ins. Aff. Dom. An., 1896, p. 246.)
Colpocephalum fuscipes Piaget.

Sterna maxima.
Docophorus melanocephalus Burmeister.
Nirmus hebes Kellogg.
præstans Kellogg.

Sterna forsteri.
Menopon tridens Nitzsch, var. *insolens* Kellogg.

Diomedea nigripes.
Lipeurus confidens Kellogg.
densus Kellogg.
Eurymetopus brevis Dufour.

Diomedea albatrus.
Nirmus giganticola Kellogg.
Lipeurus concinnus Kellogg and Chapman.
diversus Kellogg (stragglers?).
densus Kellogg.
ferox Giebel.
Giebelia mirabilis Kellogg. (Straggler?)
Eurymetopus brevis Dufour.
Colpocephalum pingue Kellogg.
Menopon irrumpens Kellogg and Chapman.
navigans Kellogg.

Diomedea exulans.

Eurymetopus brevis Dufour.

Diomedea brachyura.

Lipeurus ferox Giebel.

Fulmarus glacialis glupischa.

Docophorus occidentalis Kellogg.
Nirmus maritimus Kellogg and Chapman.
Lipeurus celer Kellogg.
varius Kellogg.
Eurymetopus brevis Dufour (straggler?).
Ancistrona gigas Piaget.
Menopon numerosum Kellogg.

Fulmarus glacialis rodgersi.

Docophorus occidentalis Kellogg.
Lipeurus celer Kellogg.
varius Kellogg.
Eurymetopus brevis Dufour.
Ancistrona gigas Piaget.
Menopon numerosum Kellogg.

Puffinus creatopus.

Lipeurus diversus Kellogg.
laculatus Kellogg and Chapman.
fuliginosus Taschenberg, var. *major* Kellogg and Chapman.
testaceus Taschenberg.
Giebelia mirabilis Kellogg.
Menopon paululum Kellogg and Chapman.

Puffinus gavia.

Docophorus validus Kellogg and Chapman.
Lipeurus diversus Kellogg.
fuliginosus Taschenberg, var. *major* Kellogg and Chapman.
limitatus Kellogg.
testaceus Taschenberg.
Giebelia mirabilis Kellogg and Chapman.
Eurymetopus brevis Dufour (straggler?).
Ancistrona gigas Piaget.
Menopon paululum Kellogg and Chapman.
petulans Kellogg and Chapman.

Puffinus griseus.

Nirmus pacificus Kellogg and Chapman.
giganticola Kellogg.
Lipeurus diversus Kellogg.
limitatus Kellogg.
Giebelia mirabilis Kellogg.
Ancistrona gigas Piaget.
Menopon paululum Kellogg and Chapman.
petulans Kellogg and Chapman.

Puffinus tenuiorostris.
Lipeurus diversus Kellogg.
limitatus Kellogg.
Giebelia mirabilis Kellogg.

Puffinus bulleri.
Lipeurus diversus Kellogg.
limitatus Kellogg.
Giebelia mirabilis Kellogg.

(?) **Oceanites oceanicus** ("*Thalassidroma wilsoni;*" Osborn, Ins. Aff. Dom. An., 1896, p. 235).
Lipeurus subangusticeps Piaget.

Phaëthon æthereus.
Docophorus phaëtonus Osborn.

Sula alba.
Lipeurus pullatus Nitzsch.

Sula bassana.
Lipeurus pullatus Nitzsch.

(?) **Sula** sp. (Osborn; Ins. Aff. Dom. An., 1896, p. 217.)
Docophorus bassanæ Denny.

Phalacrocorax penicillatus.
Lipeurus faralloni Kellogg.
Menopon titan Nitzsch var. *incompositum* Kellogg.

Phalacrocorax dilophus.
Lipeurus longicornis Piaget.

Phalacrocorax dilophus albociliatus.
Lipeurus faralloni Kellogg.
toxoceros Nitzsch.

Pelecanus erythrorhynchus.
Lipeurus forficulatus Nitzsch.
bifasciatus Piaget.
Colpocephalum unciferum Kellogg.
Menopon consanguineum Piaget.
titan Nitzsch var. *impar* Kellogg.

Pelecanus californicus.
Lipeurus forficulatus Nitzsch.
toxoceros Nitzsch. (Straggler?)
Colpocephalum unciferum Kellogg.
Menopon titan Nitzsch var. *linearis* Kellogg.

Fregata aquila.
Lipeurus gracilicornis Piaget, var. *major* Kellogg.
Colpocephalum spineum Kellogg.
Menopon aurifasciatum Kellogg.

Merganser serrator.
Docophorus icterodes Nitzsch.
Lipeurus squalidus Nitzsch.
temporalis Nitzsch.
Trinoton lituratum Nitzsch.
luridum Nitzsch.

Anas boschas.
Docophorus icterodes Nitzsch.
Lipeurus squalidus Nitzsch.
Trinoton luridum Nitzsch.

Anas americana.
Trinoton luridum Nitzsch.

Anas carolinensis.
Docophorus icterodes Nitzsch.
Trinoton luridum Nitzsch.

Anas discors.
Trinoton lituratum Nitzsch.

Spatula clypeata.
Lipeurus squalidus Nitzsch.
Trinoton lituratum Nitzsch.
luridum Nitzsch.

Dafila acuta.
Docophorus icterodes Nitzsch.
Trinoton lituratum Nitzsch.
luridum Nitzsch.

Aythya americana.
Docophorus icterodes Nitzsch.

Aythya marila nearctica.
Docophorus icterodes Nitzsch.
Trinoton luridum Nitzsch.

Aythya affinis.
Docophorus icterodes Nitzsch.

Charitonetta albeola.
Lipeurus squalidus Nitzsch.

Eniconetta stelleri.
Lipeurus squalidus Nitzsch.

Oidemia deglandi.
Lipeurus constrictus Kellogg.
Menopon loomisii Kellogg.

Oidemia perspicillata.
Docophorus icterodes Nitzsch.
occidentalis Kellogg.
Lipeurus constrictus Kellogg.

Oidemia sp. ("Butter-bill Coot, Oidemia;" Osborn, Ins. Aff. Dom. An., 1896, p. 248.)
Trinoton minor Osborn.

Erismatura rubida.
Docophorus icterodes Nitzsch.
pertusus Nitzsch.
Lipeurus squalidus Nitzsch.
Trinoton luridum Nitzsch.

Anser albifrons.
Lipeurus jejunus Nitzsch.

Branta canadensis.
Ornithobius goniopleurus Denny.

(?) **Olor buccinator.** (Osborn, Ins. Aff. Dom. An., 1896, pp. 217, 236.)
Docophorus cygni Denny.
Ornithobius cygni Linnæus.

(?) **Ajaja ajaja.** (Osborn, Ins. Aff. Dom. An., 1896, p. 217.)
Docophorus sphenophorus Nitzsch.

Guara alba.
Docophorus bisignatus Nitzsch.

Botaurus lentiginosus.
Lipeurus botauri Osborn.

Botaurus sp. (Osborn, Ins. Aff. Dom An., 1896, p. 234.)
Lipeurus leucopygus fasciata Piaget.

Ardea egretta.
Colpocephalum laticeps Kellogg.

Ardea virescens.
Colpocephalum diffusum Kellogg.

Grus americana.
Colpocephalum assimile Piaget.

Rallus obsoletus.
Oncophorus bisetosus Piaget, var. *californicus* Kellogg and Chapman.
Menopon tridens Nitzsch.

Rallus virginianus.
Oncophorus bisetosus Piaget, var. *californicus* Kellogg and Chapman.
Menopon tridens Nitzsch.

Porzana noveboracensis.
Oncophorus bisetosus Piaget, var. *porzanæ* Piaget.

Fulica americana.

Docophorus graviceps Kellogg.
minutotrabeculatus Osborn.
quadraticeps Kellogg.
pertusus Nitzsch.
Lipeurus longipilus Kellogg.
luridus Nitzsch.
picturatus Kellogg.
Oncophorus advena Kellogg.
minutus Nitzsch.
Lœmobothrium atrum Nitzsch.
Menopon tridens Nitzsch.
tridens Nitzsch, var. *pacificum* Kellogg.

Phalaropus tricolor.

Nirmus furvus Nitzsch.

Recurvirostra americana. ("Avocet," Osborn, Ins. Aff. Dom. An., 1896, p. 224.)

Nirmus signatus Piaget.
piceus Nitzsch.
Colpocephalum uniforme Kellogg.
Menopon indistinctum Kellogg.

Philohela minor.

Lipeurus infuscatus Osborn.
Menopon crocatum Nitzsch.

Tringa maculata.

Colpocephalum ochraceum Nitzsch.

Tringa minutilla.

Docophorus fusiformis Denny.
Nirmus complexivus Kellogg and Chapman.

Tringa sp.

Nirmus fissus Nitzsch, var. *major* Kellogg.

Tringa sp.

Docophorus cordiceps Giebel. "Black-billed Sandpiper" (Osborn; Ins. Aff. Dom. An., 1896, p. 217).
Docophorus fusiformis Denny.

Calidris arenaria.

Nirmus actophilus Kellogg and Chapman.
complexivus Kellogg and Chapman.
Colpocephalum spinulosum Piaget, var. *minor* Kellogg and Chapman.

Limosa fedoa.

Nirmus cordatus Osborn.

Limosa hæmastica.

Nirmus cordatus Osborn.
Menopon crocatum Nitzsch.

Bartramia longicauda.
Docophorus testudinarius Denny.
Lipeurus infuscatus Osborn.

Actitis macularia.
Docophorus cordiceps Giebel.
Nirmus furvus Nitzsch, var. *ravus* Kellogg.

Numenius longirostris.
Docophorus testudinarius Denny.

Charadrius squatarola.
Docophorus fuliginosus Kellogg.
Nirmus incœnis Kellogg and Chapman.
Colpocephalum timidum Kellogg.

Charadrius dominicus.
Nirmus orarius Kellogg.
Colpocephalum timidum Kellogg.

Ægialitis vocifera.
Nirmus boephilus Kellogg.
parallelus Osborn.

Ægialitis semipalmata.
Docophorus fuliginosus Kellogg.
Nirmus opacus Kellogg and Chapman.

Colinus virginianus.
Nirmus abruptus Osborn.
Lipeurus dissimilis Piaget.
Goniodes ortygis Piaget.
Menopon pallescens Nitzsch.

(?) **Colinus virginianus.** ("Quail;" Osborn, Ins. Aff. Dom. An., 1896, p. 230.)
Goniodes dispar Nitzsch.

Oreortyx pictus plumiferus.
Lipeurus docophoroides Piaget, var. *californicus* Kellogg and Chapman.

Callipepla californica.
Lipeurus docophoroides Piaget.
Goniodes mammillatus Rudow.

Dendragopus obscurus fuliginosus.
Lipeurus perplexus Kellogg and Chapman.

(?) **Dendragopus obscurus richardsoni.** (Packard, Ann. Rept. U. S. Geol. Survey, 1872, p. 731.)
Goniodes merriamanus Packard.

Lagopus lagopus.
Lipeurus protervus Kellogg.
Goniodes mammillatus Rudow.
Menopon striatum Kellogg.

Tympanuchus americanus.
Goniodes cupido Giebel.

Pediocætes phasianellus columbianus.
Lipeurus perplexus Kellogg and Chapman.
Goniodes mammillatus Rudow.

Gallus gallus.
(?) *Colpocephalum longicaudum* Piaget. (Osborn, Ins. Aff. Dom. An., 1896, p. 246.)

Gallus domesticus. (Domestic fowl.)
Lipeurus heterographus Nitzsch.
variabilis Nitzsch.
Menopon biseriatum Piaget.
pallidum Nitzsch.

Meleagris gallopavo. (Turkey.)
Lipeurus polytrapezius.
Goniodes stylifer Nitzsch.

Phasianus nycthemerus.
Lipeurus introductus Kellogg.
Goniocotes creber Kellogg.
Goniodes cervinicornis Giebel.
Menopon monostæchum Kellogg.

Pavo cristatus. (Peacock.)
Goniodes falcicornis Nitzsch.

Columba livia. (Domestic pigeon.)
Lipeurus baculus Nitzsch.
Goniocotes compar Nitzsch.
Goniodes damicornis Nitzsch.
Colpocephalum longicaudum Piaget.
Menopon longicephalum Kellogg.

Elanoides forficatus. ("Swallow-tailed kite;" Osborn, Ins. Aff. Dom. An., 1896, p. 246.)
Colpocephalum flavescens Nitzsch.

Elanus leucurus.
Nirmus fuscus Nitzsch.
Colpocephalum osborni Kellogg.
Menopon decoratum Kellogg.

Elanus sp. ("Milvus sp."; Osborn, Ins. Aff. Dom. An., 1896, p. 244.)
Menopon fulvofasciatum Piaget.

Circus hudsonius.
Nirmus fuscus Nitzsch.

Accipiter velox.
Docophorus platystomus Nitzsch.
Nirmus fuscus Nitzsch.

Accipiter atricapillus striatulus.
Nirmus fuscus Nitzsch.

Buteo borealis calurus.
Nirmus fuscus Nitzsch.

Buteo borealis lucusanus.
Nirmus fuscus Nitzsch.

Buteo lineatus.
Docophorus buteonis Packard.

Buteo swainsoni.
Docophorus platystomus Nitzsch.
Nirmus fuscus Nitzsch.

Archibuteo lagopus sancti-johannis.
Docophorus taurocephalus Kellogg.
Nirmus fuscus Nitzsch.
Colpocephalum flavescens Nitzsch.

Aquila chrysaëtos.
Docophorus pictus Giebel.
Colpocephalum flavescens Nitzsch.

Aquila imperialis.
Docophorus platystomus Nitzsch.

Thrasaëtos harpyia ("Harpy eagle"; Osborn, Ins. Aff. Dom. An., 1896, p. 247).
Læmobothrium giganteum Nitzsch.

Haliaëtus leucocephalus.
Docophorus halieti Osborn.
Nirmus discocephalus amblys Kellogg.
Lipeurus pustulatus Osborn.
Colpocephalum flavescens Nitzsch.

Falco peregrinus anatum.
Nirmus fuscus Nitzsch.

Falco sparverius deserticola.
Nirmus fuscus Nitzsch.

Falco sparverius peninsularis.
Nirmus fuscus Nitzsch.

Polyborus cheriway.
Nirmus splendidus Kellogg.
Colpocephalum maculatum Piaget.

Strix pratincola.
Docophorus rostratus Nitzsch.

Asio wilsonianus.
Docophorus cursor Nitzsch.

Syrnium nebulosum.
Docophorus specotyti Osborn.
syrnii Packard.

Scotiaptex cinerea.
Oncophorus remotus Kellogg and Chapman.

Bubo virginianus.
Docophorus bubonis Osborn.
cursor Nitzsch.
Colpocephalum subpachygaster Piaget.

Nyctea nyctea.
Docophorus ceblebrachys Nitzsch.

Speotyto cunicularia hypogæa.
Docophorus speotyti Osborn.

Crotophaga sulcirostris.
Lipeurus macgregori Kellogg.

Coccyzus americanus ("Yellow-billed cuckoo," Osborn, Ins. Aff. Dom. An., 1896, p. 222).
Docophorus coccygi Osborn.

Coccyzus americanus occidentalis.
Docophorus latifrons Nitzsch, var. *occidentalis* Kellogg.

Coccyzus erythrophthalmus.
Nirmus fenestratus Nitzsch.

Piaya cayana thermophila.
Nirmus atopus Kellogg.
Colpocephalum diffusum Kellogg.

Ceryle alcyon.
Colpocephalum pustulosum Piaget.

Dryobates villosus.
Docophorus superciliosus Nitzsch.
Nirmus candidus Nitzsch.

Dryobates pubescens.
Docophorus evagans Rudow.

Dryobates pubescens gairdneri.
Menopon funereum Kellogg and Chapman.

Dryobates nuttalli.
Docophorus singularis Kellogg and Chapman.

Xenopicus albolarvatus.
Docophorus californiensis Kellogg.

Sphyrapicus thyroideus.
Docophorus californiensis Kellogg.

Ceophlœus pileatus.
Nirmus marginatus Osborn.

Melanerpes formicivorus bairdii.
Docophorus californiensis Kellogg.

Melanerpes formicivorus angustifrons.
Docophorus californiensis Kellogg.

Melanerpes carolinus.
Nirmus candidus Nitzsch.

Melanerpes uropygialis.
Menopon præcursor Kellogg.

Melanerpes wagleri.
Physostomum invadens Kellogg.

Colaptes auratus.
Docophorus jungens Kellogg.
alienus Kellogg.
Nirmus candidus Nitzsch.

Chordeiles virginianus henryi.
Lipeurus macrocephalus Kellogg.

Chætura pelagica.
Nitzschia pulicaris Nitzsch.
dubius Kellogg.

Trochilus colubris.
Physostomum lineatum Osborn.

Trochilus alexandri.
Nirmus vulgatus Kellogg.

Colypte costæ.
Physostomum prominens Kellogg and Chapman.

Colypte anna.
Nirmus eustigmus Kellogg.

Selasphorus rufus.
Nirmus snodgrassi Kellogg.

Tyrannus tyrannus.
Physostomum angulatum Kellogg.

Tyrannus verticalis.
Nirmus fœdus Kellogg and Chapman.

Tyrannus atra.
Docophorus buteonis Packard (probably a case of straggling; see *Buteo lineatus*).

Tyrannus sp. (Osborn, Ins. Aff. Dom. An., 1896, p. 228.)
Nirmus tyrannus Osborn.

Myiarchus cinerascens.
Docophorus communis Nitzsch.
fusco-ventralis Osborn.
rufus Kellogg.
Nirmus foedus Kellogg and Chapman.
vulgatus Kellogg.
Physostomum sp.
Menopon distinctum Kellogg and Chapman.

Myiarchus cinerascens nuttingi.
Docophorus rufus Kellogg.

Sayornis saya.

Nirmus foedus Kellogg and Chapman.
Physostomum sp.

Contopus virens.

Docophorus fusco-ventralis Osborn.

Contopus richardsonii.

Physostomum sp.

Empidonax difficilis.

Docophorus communis Nitzsch.
Nirmus ductilis Kellogg and Chapman.
vulgatus Kellogg.
Physostomum sucinaceum Kellogg.
sp.?

Elainea subpagana.

Physostomum pallens Kellogg.
Colpocephalum diffusum Kellogg.

Otocoris alpestris.

Docophorus communis Nitzsch.

Otocoris alpestris chrysolæma.

Docophorus communis Nitzsch.

Otocoris sp. (Osborn; "shore lark.")

Docophorus communis Nitzsch.

Cyanocitta stelleri frontalis.

Docophorus communis Nitzsch.
Nirmus vulgatus Rudow.

Aphelocoma californica.

Docophorus communis Nitzsch.
Menopon persignatum Kellogg and Chapman.

Corvus corax sinuatus.

Docophorus distinctus Kellogg.
Colpocephalum subaequale Nitzsch.

Corvus americanus.

Docophorus corvi Osborn.
Nirmus secundarius Osborn.
rotundatus Osborn.
Colpocephalum subaequale Nitzsch.
Menopon mesoleucum Nitzsch, var. *americanum* Kellogg.
interruptus Osborn.

(?) Corvus americanus.

Lipeurus corvi Packard. (Osborn, Ins. Aff. Dom. An., p. 221, thinks this *Lipeurus* is an immature specimen of *Docophorus corvi* Osborn.)

Dolichonyx oryzivorus.

Menopon expansum Osborn.

Molothrus ater.
Docophorus transpositus Kellogg.

Xanthocephalus xanthocephalus.
Nirmus ornatissimus Giebel, var. *xanthocephali* Osborn.

Agelaius phœniceus.
Docophorus communis Nitzsch.
agelaii Osborn.
Nirmus illustris Kellogg.
ornatissimus Giebel.

Sturnella magna.
Nirmus picturatus Osborn.

Sturnella magna neglecta.
Docophorus communis Nitzsch.

Icterus galbula.
Menopon crassipes Piaget.

Icterus bullocki.
Docophorus communis Nitzsch.

Scolecophagus cyanocephalus.
Docophorus communis Nitzsch.

(?) **Quiscalus quiscula.** ("Crow-blackbird," Osborn, Ins. Aff. Dom. An., 1896, p. 219.)
Docophorus quiscali Osborn.

Amblycercus holosericeus.
Nirmus virgatus Kellogg.
Colpocephalum diffusum Kellogg.

Coccothraustes vespertinus montanus.
Menopon funereum Kellogg and Chapman.

Carpodacus purpureus californicus.
Docophorus communis Nitzsch.
Nirmus vulgatus Kellogg.

Carpodacus mexicanus frontalis.
Docophorus communis Nitzsch.
Nirmus vulgatus Kellogg.
Physostomum microcephalum Kellogg.

Loxia curvirostra minor.
Docophorus compar Piaget.

(?) **Acanthis linaria** (Osborn; Ins. Aff. Dom. An., 1896, p. 224).
Nirmus cyclothorax Nitzsch.

Spinus tristis.
Menopon carduelis Piaget.
incertum Kellogg.

Spinus psaltria.
Docophorus communis Nitzsch.

Spinus pinus.
Docophorus communis Nitzsch.

Plectrophenax nivalis.
Docophorus hamatus Packard.
Nirmus thoracicus Packard.

Calcarinus lapponicus.
Docophorus communis Nitzsch.

Ammodramus sandwichensis.
Docophorus communis Nitzsch.
Physostomum diffusum Kellogg.

Chondestes grammacus strigatus.
Docophorus communis Nitzsch.
Nirmus vulgatus Kellogg.
Menopon incertum Kellogg.

Zonotrichia leucophrys intermedia.
Docophorus communis Nitzsch.

Zonotrichia leucophrys gambelii.
Docophorus communis Nitzsch.
Nirmus vulgatus Kellogg.

Zonotrichia coronata.
Docophorus communis Nitzsch.
Nirmus vulgatus Kellogg.
Physostomum diffusum Kellogg.
Menopon mæstum Kellogg and Chapman.

Spizella socialis arizonæ.
Docophorus communis.

Junco hyemalis.
Docophorus communis Nitzsch.
Nirmus vulgatus Kellogg.

Junco hyemalis oregonus.
Physostomum diffusum Kellogg.

Junco hyemalis thurberi.
Docophorus mirinotatus Kellogg and Chapman.

Junco sp.
Physostomum diffusum Kellogg, var. *pallidum* Kellogg.

Amphispiza belli.
Docophorus communis Nitzsch.
Nirmus lautiusculus Kellogg and Chapman.

Melospiza fasciata samuelis.
Docophorus communis Nitzsch.
Colpocephalum chrysophæum Kellogg.
Menopon mæstum Kellogg and Chapman
Physostomum sp.

Melospiza fasciata heermanni.
Colpocephalum grandiculum Kellogg and Chapman.

Passerella iliaca.
Physostomum frenatum Nitzsch.
angulatum Kellogg.

Pipilo erythrophthalmus.
Physostomum frenatum Nitzsch.
Menopon melanorum Kellogg.

Pipilo maculatus megalonyx.
Nirmus vulgatus Kellogg.
Physostomum sp.

Pipilo fuscus crissalis.
Docophorus communis Nitzsch.
Nirmus vulgatus Kellogg.
Colpocephalum grandiculum Kellogg and Chapman.
Physostomum sp.

Cardinalis cardinalis.
Docophorus communis Nitzsch.

Cardinalis cardinalis igneus.
Docophorus communis Nitzsch.

Habia ludoviciana.
Nirmus pallidus Osborn.

Habia melanocephala.
Docophorus communis Nitzsch.

Guiraca cærulea eurhyncha.
Docophorus communis Nitzsch.
Nirmus vulgatus Kellogg.

Passerina amœna.
Nirmus vulgatus Kellogg.

Passerina versicolor.
Physostomum australe Kellogg.

Piranga ludoviciana.
Docophorus communis Nitzsch.

Phœnicothraupis fuscicauda.
Docophorus panamensis Kellogg.
Colpocephalum diffusum Kellogg.

Passer domesticus.
Nirmus cyclothorax Nitzsch.

Progne subis.
Docophorus domesticus Kellogg.
Nirmus gracilis Nitzsch.
Menopon rusticum Giebel.
dissimile Kellogg.

Progne subis hesperus.
Docophorus domesticus Kellogg.

Petrochelidon lunifrons.
Docophorus excisus Nitzsch, var. *major* Kellogg.
Nirmus longus Kellogg.
Menopon malleus Nitzsch.

Chelidon erythrogaster.
Nirmus longus Kellogg, var. *domesticus* Kellogg and Chapman.

Tachycineta bicolor.
Docophorus excisus Nitzsch, var. *major* Kellogg.
Nirmus longus Kellogg.

Ampelis garrulus.
Docophorus communis Nitzsch.
Nirmus brachythorax Giebel.

Ampelis cedrorum.
Docophorus communis Nitzsch.
incisus Kellogg.
Nirmus brachythorax Giebel.
Physostomum sp.

Phainopepla nitens.
Nirmus fœdus Kellogg and Chapman.
peninsularis Kellogg.

Lanius borealis.
Docophorus communis Nitzsch.

Lanius ludovicianus excubitorides.
Docophorus communis Nitzsch.

Lanius ludovicianus gambeli.
Docophorus communis Nitzsch.
Nirmus fœdus Kellogg and Chapman.

Vireo solitarius cassini (plumbeus?).
Docophorus communis Nitzsch.

Vireo bellii pusillus.
Physostomum sp.

Saltator albicollis.
Colpocephalum diffusum Kellogg.

Chiroxiphia lanceolata.
Physostomum invadens Kellogg.
Colpocephalum diffusum Kellogg.

Arremonops striaticeps.
Colpocephalum diffusum Kellogg.

Protonotaria citrea.
Physostomum pallens Kellogg.

Helminthophila celata lutescens.
Nirmus vulgatus Kellogg.

Dendroica æstiva.
Docophorus communis Nitzsch.
Nirmus interpositus Kellogg.
vulgatus Kellogg.
Menopon ridulosum Kellogg and Chapman.

Dendroica vieilloti.
Nirmus interpositus Kellogg.
Colpocephalum diffusum Kellogg.

Icteria virens longicauda.
Nirmus fœdus Kellogg and Chapman.

Cinclus mexicanus.
Docophorus laticeps Giebel, var. *americanus* Kellogg.
Nirmus vulgatus Kellogg.

Galeoscoptes carolinensis.
Nirmus orpheus Osborn.

Harporhynchus rufus.
Docophorus communis Nitzsch.

Helodytes brunneicapillus.
Menopon distinctus Kellogg and Chapman.
malleus Nitzsch.

Thryothorus bewicki spilurus.
Docophorus communis Nitzsch.
mirus Kellogg and Chapman.
Menopon incertum Kellogg.

Parus inornatus.
Docophorus communis Nitzsch.

Parus atricapillus occidentalis.
Docophorus rutteri Kellogg.

Parus gambeli,
Nirmus vulgatus Kellogg.

Parus rufescens neglectus.
Nirmus vulgatus Kellogg.

Psaltriparus minimus.
Colpocephalum fumidum Kellogg.
Menopon robustum Kellogg.

Auriparus flaviceps.
Nirmus audax Kellogg.

Regulus satrapa. ("Golden-crowned kinglet;" Osborn, Ins. Aff. Dom. An., 1896, p. 248.)
Physostomum frenatum Nitzsch.

Turdus ustulatus.
Menopon incertum Kellogg.

Turdus aonalaschkæ auduboni.
Docophorus communis Nitzsch.

Turdus minor.

Menopon fuscomarginatus Osborn.

Merula migratoria.

Docophorus communis Nitzsch
Nirmus vulgatus Kellogg.
simplex Kellogg.

Sialia sialis.

Docophorus incisus Kellogg.
sialii Osborn.

Sialia mexicanus occidentalis.

Docophorus communis Nitzsch.
Nirmus vulgatus Kellogg.

MAMMALS.

Cattle.

Trichodectes scalaris Nitzsch.

Horse.

Trichodectes parumpilosus Piaget.

Goat.

Trichodectes climax Nitzsch.
limbatus Gervais.

Sheep.

Trichodectes spærocephalus Nitzsch.

Cat.

Trichodectes subrostratus Nitzsch.

Putorius ermineus.

Trichodectes retusus Nitzsch.

(?) **Putorius vulgaris** ("Weasel"; Osborn, Ins. Aff. Dom. An., 1896, p. 237).

Trichodectes retusus Nitzsch.

Erethizon dorsatum.

Trichodectes setosus Giebel.

Procyon lotor.

Trichodectes crassus Nitzsch.

Geomys bursarius.

Trichodectes geomydis Osborn.

Thomomys bottæ.

Trichodectes geomydis Osborn.

(?) **Cariacus virginianus** ("Deer"); Osborn, Ins. Aff. Dom. An., 1896, p. 241).

Trichodectes parallelus Osborn.

Cariacus columbianus.

Trichodectes tibialis Osborn.

Castor canadensis.

Trichodectes castoris Osborn.

Spilogale interrupta.

Trichodectes mephitidis Osborn.

Mephites mephitica.

Trichodectes mephitidis Osborn.

Cavia sobaya.

Gyropus ovalis Nitzsch.

gracilis Nitzsch.

SUMMARY.

Genera of North American birds from which Mallophaga are recorded	167
Species of North American birds from which Mallophaga are recorded	257
Species of North American mammals (including domestic animals) from which Mallophaga are recorded	15

NEW SPECIES OF NOCTURNAL MOTHS OF THE GENUS CAMPOMETRA, AND NOTES.

By JOHN B. SMITH, Sc. D.,
Rutgers College, New Brunswick, New Jersey.

The genus *Campometra* was described in 1852 by Guenée,[1] and the sole species and therefore generic type, *amella*, was figured (Pl. XVIII, fig. 8). Mr. Grote never positively identified this species, although the picture is good and the markings are characteristic. In the Neumoegen collection he did note, however, to a specimen of *Eubolina stylobata* a suggestion that it might be *C. amella*, and that proves to be correct without reasonable doubt. I have not seen the Guenée type, but both description and picture apply to *stylobata* and to nothing else. The type of *stylobata* I saw in the collection of the British Museum, and on direct comparison with the type of *Homoptera integerrima* Walker found the two identical.

The synonymy then seems to be fairly well established, as follows:

Campometra amella GUENÉE, Sp. Gen. Noct., III, 1852, p. 25, pl. XVIII, fig. 8.
Homoptera integerrima WALKER, Cat. Brit. Mus., Het., XIII, 1857, p. 1057.
Homoptera stylobata HARVEY, Can. Ent., VIII, 1876, p. 155.
Eubolina stylobata GROTE, New List, 1882, p. 42.

The genus *Eubolina* was described by Harvey[2] for his species *impartialis*, described at the same time, and that is therefore the type of the genus. In 1882 Mr. Henry Edwards described *Eubolina meskei*, and in the same year Mr. Grote referred *Homoptera mima* Harvey to *Eubolina* in his New List; the genus thus containing four species, two of which its describer had not considered as referable to it when they were characterized by him.

E. impartialis differs in color and general appearance from the allied forms, and on the female, which only I have at hand, the middle tibiæ are lengthily spinulated, the clothing close, the armature in a single series and very prominent.

Campometra amella has the legs all shorter and quite densely clothed with hair and scales, the middle tibiæ with apparently a few scattered spinules. In the male there seem to be no sexual tuftings on this member.

[1] Spec. Gen. Noct., III, p. 25.
[2] Bull. Buff. Soc. Nat. Sci., II, 1875, p. 281.

Homoptera mima has the tibiæ moderately clothed, not at all spinulated, in the male with distinct brush-like tufts of scales on the middle pair.

E. meskei is inaccessible to me at present writing, but its appearance is such that I would expect to find it in accord with the generic type, and to *impartialis* and *meskei* I would tentatively restrict the term *Eubolina*.[1]

A close ally of *C. amella* in structure, size, and general type of maculation is:

CAMPOMETRA BILINEATA, new species.

Ground color umber brown, a little dusted with reddish. Head immaculate. Collar a little paler at base, tipped with steely blackish. Thoracic disk intermixed with similar deep blue-black scales, which also sprinkle the patagiæ and extend over the abdomen. Abdominal tuftings brown, gray scales becoming dominant at the sides and beneath. Primaries with clean, well-marked ornamentation. Basal line single, black, broken, accompanied by a brownish shade which breaks the otherwise solidly dark basal space, the tint being bluish black. Transverse anterior line single, upright, with a small outward bend just below the cell. Transverse posterior line single, red brown, irregularly crenulated, outcurved over the reniform, with a deep acute inward tooth in the submedian interspaces. Subterminal line incomplete, vaguely defined, white, slender, denticulate in the costal region, lost below that point except as it is marked by dusky clouds to vein 2, below which it is brown and slender to the margin. A broken blackish transverse line just before the margin. Just within the center of the wing are two upright, slightly wavy, prominent black lines, just enough separated to avoid a band. The inner is somewhat narrower, sharper, and more intensely black, the outer broader and a little diffuse. Orbicular wanting in the specimen. Reniform large, irregularly oval, white, with narrow brown central lines. Secondaries a little more powdery and diffuse in ground color. A geminate black line at basal third, which does not reach either margin. A broad, dusky, submarginal shade, which is suffused with rusty reddish at its middle and terminates at the anal angle in a steely black spot. A broken, narrow, black terminal line and the fringes with a crenulated black interline. Beneath whitish, powdery, wings darkening outwardly. Primaries with an inner dusky band marked on the costa only, and an outer one which extends nearly half across the wing. Secondaries with an inner dusky band, which forms a lunule in the cell, a broken, diffuse, median shade and a submarginal clouding which forms a marked dusky patch above the anal angle.

Expands 1.75 inches=44 mm.

[1] Dr. Dyar informs me that the type of *meskei* is a male, has unarmed middle tibiæ, and no sexual tuftings. On general color and wing form the two may yet be held together until more material gives us better basis for other action.

Type.—No. 4316, U.S.N.M.

Habitat.—Brownsville, Texas; June 10; Townsend, No. 544.

A single female specimen from the U. S. National Museum. The resemblance to *amella* in size, form, and general appearance is obvious; but the distinctive feature, the parallel black lines near the center of the wing, is equally prominent. A further difference is that in *amella* the subterminal line is well defined, angulated and prominent, while in the new species this line is practically obsolete. It should be added to the description that an irregularly waved, somewhat diffuse bluish black band runs through the subterminal space and crosses the subterminal line at its inception on the costa.

CAMPOMETRA CINCTIPALPIS, new species.

Ground color a deep purplish red-brown, the primaries with elevated black, squamose vestiture that gives a velvety appearance. Front with a pale yellowish, transverse band, a pale tuft at base of each antenna, and the palpi pale banded. Thorax purplish without defined markings. Primaries with an intermingling of pale and yellowish scales that gives a somewhat mossy appearance and obscures the ordinary maculation. Basal line faintly traceable by black scales. Transverse anterior line upright, blackish, a little wavy, preceded by a purplish shade which is itself limited by a darker brown, diffuse, shading; followed by a mossy brown shade line. A narrow, black, irregular median line of elevated scales. Transverse posterior line narrow, black, irregularly waved and toothed, squarely exserted over the reniform and almost as squarely inset beneath it; followed at some distance by a broader, less defined, and more even brown shading. Subterminal line distinct, pale, irregularly but not greatly sinuated. Orbicular small, round, incompletely and obscurely brown ringed and with a brown central dot. Reniform not defined, marked by a small upper and larger lower white spot, the two connected by a narrow, white line. Secondaries uniform smoky brown, the fringes with a pale interline. Beneath, primaries smoky, powdery, with a partial extramedian transverse line. Secondaries whitish, powdery at base, with a brown discal spot and a crenulated brown median line, beyond which the wing is brown nearly to the margin, which is again whitish.

Expands 1.35 inches=34 mm.

Type.—No. 4315, U.S.N.M.

Habitat.—Cocoanut Grove, Florida; E. A. Schwarz.

A single defective female from the U. S. National Museum. The apices of both wings are rubbed and broken, but the specimen is otherwise very fair, all the markings being discernible on one side or the other. It is the darkest species of the genus and has no contrasts in maculation. The immaculate secondaries will further serve to differentiate it from the other described forms. The middle tibia seems to have no obvious spinose armature, but has a central ring tuft of scales.

CAMPOMETRA MIMA Harvey.

The most common of the species, and as they run, very sharply defined. The transverse anterior line is geminate, both defining lines black, rather widely separated, the intervening space dusky so as to form an evenly outcurved dusky band. The transverse posterior line is also black, well marked, and squarely exserted beyond the reniform. A yellowish or reddish brown shade lightens the wing and dominates the impression gained by an ordinary examination of the species.

The middle tibiæ are unarmed and in the male have a very heavy scale tuft; but there are no hair pencils.

Twenty specimens are under examination: San Diego, Texas, April 26, May 25; Bastrop County, and other Texan localities; Florence, Tucson, Catalina Springs April 11, Oracle, July 21, and other localities in Arizona. The tendency in the variation is to a more indistinct maculation.

CAMPOMETRA FRATERNA, new species.

Resembles *mima* in all essential characters and differs from that species in the powdery, uniform ashen gray primaries lacking the brownish shadings, and on which the maculation is only feebly written. The transverse anterior line shows no tendency to band and, while the other lines and shades of *mima* are all traceable, none are well marked. In the structure of the middle tibiæ of the male the species is like its ally.

Type.—No. 4313, U.S.N.M.

I have six specimens, five of them females, from Death Valley (April), Oracle (July 7), and Catalina Springs (May 5), Arizona. All are from the U. S. National Museum, collected by Messrs. Koebele or Hubbard and Schwarz.

CAMPOMETRA MINOR, new species.

Smaller than *mima* throughout, few of the specimens exceeding and some not reaching 26 mm., or a trifle over 1 inch, the primaries even, powdery gray, none of the markings well written, though so far as traceable, similar to *mima*. It is a slighter, narrower winged form than *fraterna*, which equals *mima* in average size and has the primaries more squared. No male of this species has been available. Of the five females four are from the Hulst collection, probably taken near Tucson Arizona, and one is from Catalina Springs (April 11), taken by Mr. Schwarz. The latter has a white shading over the reniform, extending beyond the transverse posterior line almost to the subterminal line, the edges of this shade being indefined. The smoky margin of the secondaries is narrower than in the allied forms and there is less tendency to a banding.

Type.—No. 4314, U.S.N.M.

Altogether the species are left in a somewhat unsatisfactory condition. *Amella*, *bilineata*, and *cinctipalpis* are probably congeneric and, except for a doubt about the armature of *cinctipalpis*, are strictly referable to *Campometra*.

Mima, *fraterna*, and *minor* are close allies, yet I think, distinct, and they differ from *Campometra* in the totally unarmed middle tibia, which in the male is very heavily clothed with long scales forming a real tufting. I prefer leaving them with *Campometra* temporarily, until all the allied genera can be carefully studied, but suggest the term *Heteranassa* in case generic separation seems desirable.

SYNOPSIS OF THE SOLENIDÆ OF NORTH AMERICA AND THE ANTILLES.

By WILLIAM H. DALL,
Curator, Division of Mollusks.

In revising the group for the purpose of monographing the fossil species so many changes in nomenclature and distribution were found to be involved that it was thought the following summary would prove useful to students of the recent forms:

EAST AMERICAN SPECIES.

Genus SOLEN (Linnæus, 1758) Scopoli, 1777.

(*Vagina* Megerle, 1811; + *Hypogæa* and *Hypogæoderma* Poli, 1791-1795; + *Listera*, Leach manuscript, Gray, 1852.) Type, *Solen marginatus* Pulteney.

1. *Solen viridis* Say, 1822; Rhode Island (Totten) to Georgia (Postell).

Section SOLENA Mörch, 1852.

(*Solena* sp. Browne, nonbinomial, 1756; + *Hypogella* Gray, 1854.) Type, *S. obliqua* Spengler = *S. ambiguus* Lamarck.

2. *Solen* (*Solena*) *obliqua* Spengler, 1793; Cuba, Porto Rico, St. Thomas.

S. rudis Sowerby, 1874, not C. B. Adams, 1852; + *philippinarum* Sowerby, 1874, not Hanley, 1843, are synonymous.

Genus ENSIS Schumacher, 1817.

(*Ensatella* Swainson, 1840, + *Solen* Leach, 1852.) Type, *Ensis magnus* Schumacher.

1. *Ensis directus* Conrad, 1843; Labrador to Indian Key, Florida. Pliocene to recent.

E. "*americana* Beck" of H. and A. Adams, 1856, is probably a manuscript name. *Solen siliqua* Chickering, 1855, not Linnæus, 1758, is a synonym. This species was generally confounded with *Solen magnus* of Schumacher, under the name of *Solen ensis* Linnæus, by the earlier American authors.

2. *Ensis minor* Dall; Cape May to Florida and Texas.

This is *Solen ensis* var. *minor* of some of the earlier writers, and bears to *E. directus* the same relation that *Ensis ensis* Linnæus of Europe does to the north European *E. magnus* Schumacher. It differs from the young of *E. directus* in having the valves wider behind than in front and relatively narrower as a whole.

Genus SILIQUA Megerle, 1811.

(*Leguminaria* Schumacher, 1817; + *solecurtus* A Blainville, 1825; + *Aulus* Oken, 1835, not Oken 1815; + *Solecurtoides* Desmoulins, 1832; + *Solenocurtus* Sowerby, 1839; + *Machæra* Gould, 1841.) Type, *Solen radiatus* Linnæus.

1. *Siliqua squama* Blainville, 1824; Grand Banks of Newfoundland and Gulf of St. Lawrence.

This is *Machæra nitida* Gould, 1841, and *Cultellus medius* Sowerby (not Gray), Conch. Icon., 1874.

2. *Siliqua costata* Say, 1822; Gulf of St. Lawrence south to Cape Hatteras, North Carolina, in suitable localities.

The following are synonymous names: *Solecurtoides nahantensis* Desmoulins, 1832; *S. sayi* Gray, 1833; *S. radiatus* Ravenel (not Linnæus), 1834; *Cultellus grayanus* Sowerby (not Dunker?), 1874; *Cultellus subsulcatus* Sowerby, 1874; *Cultellus belcheri* (as of Gray, manuscript) Sowerby, 1874; not *C. costatus* Middendorf, 1847, nor Sowerby, 1874.

Genus PSAMMOSOLEN Risso, 1826.

(= *Psammobia* Risso, 1826, err. typ.; + *Solecurtus* B, Blainville, 1825; + *Macha* Oken, 1835; + *Adasius* Leach, 1852; not *Macha* Philippi, 1853, nor *Psammosolen* Hupé, 1854.) Type, *Solen strigilatus* Linnæus.

1. *Psammosolen sanctæ-marthæ* (Chemnitz) Orbigny, 1853; North Carolina, Bermuda, the Antilles, and south to Rio Janeiro (Dunlap).

2. *Psammosolen cumingianus* Dunker, 1861; North Carolina, to Texas and São Paulo, Brazil.

WEST AMERICAN SPECIES.

Genus SOLEN (Linnæus) Scopoli.

1. *Solen sicarius* Gould, 1850; Vancouver Island to San Pedro, California; Japan, A. Adams (?).

2. *Solen rosaceus* Carpenter, 1863; Santa Barbara, California, south to the Gulf of California; La Paz.

3. *Solen mexicanus* Dall; west coast of Tehuantepec, Mexico.

4. *Solen* (*Solena*) *rudis* C. B. Adams, 1852; Panama.

Confounded with *S. obliquus* Spengler of the Antilles by Carpenter and Sowerby.

Genus ENSIS Schumacher.

1. *Ensis californicus* Dall; Monterey, California, south to the Gulf of California; La Paz.

Genus SILIQUA Megerle.

1. *Siliqua lucida* Conrad, 1838; Monterey to San Diego, California.

Confounded with the young of *S. nuttallii* by Carpenter, 1863, and Gabb, 1868; also, according to Conrad, with *S. radiata* Linnæus.

2. *Siliqua media* Gray, 1839; Okhotsk and Bering seas and northward to the Arctic Ocean at Cape Lisburne.

Machæra costata Middendorf, 1851, not Say, 1822; + *S. borealis* Conrad, 1867, not *Cultellus medius* Sowerby, Conch. Icon., 1874, = *S. squama* Blainville.

3. *Siliqua patula* Dixon, 1788, Okhotsk Sea; the southern border of Bering Sea, and the Gulf of Alaska to Sitka.

Described from Cooks Inlet, Alaska. The following names are synonyms: *Solen maximus* Wood, 1815, not Gmelin, 1792; *S. gigas* Dillwyn, 1817; *S. grandis* (Hinds Manuscript as of Gmelin) Dunker, 1861, and Carpenter, 1863; *S. splendens* Chenu, 1845 and 1862. Large; with submedian beaks and straight rib. The following are discriminable varieties, but apparently connected by gradations with the typical *S. patula*.

4. *Siliqua* (*patula* var.) *alta* Broderip and Sowerby, 1829; Bering Sea and Strait.

This is figured under the name of *Cultellus costatus* by Sowerby, Conch. Icon., 1874, but is not the *costatus* of Say. It is short and broad with very anterior beaks and straight rib.

5. *Siliqua* (*patula* var.) *nuttallii* Conrad, 1838, Lituya Bay, Alaska, south to Oregon, and California as far as Monterey.

S. americana Chenu, 1845, may be the same, but I do not know it; *S. californica* Conrad, 1868, and *S. nuttali* Sowerby, 1874, are synonymous. The shell is very straight, brilliantly polished, narrower than the typical *S. patula* and with a much more oblique rib. The beaks are less anterior than in *S. alta*.

NOTES.

Solen tenuis Broderip and Sowerby, 1829, is unidentifiable, from the absence of a figure and the excessive brevity of the description. It is not the *S. tenuis* Gray, in Griffith's Cuvier, 1833. It was collected by Belcher, whose shells came mostly from northwest America.

Solen "lineatus Spengler," appears in Mörch's Catalogue of Poulsen's West India shells. It is probably intended for *S. linearis* Spengler (in Chemnitz) and may have been based on a misidentified specimen of *Ensis minor*.

Solen niveus Hanley is listed by Guppy in his Paria fauna, 1877, and was perhaps based on a young specimen of *S. obliquus* Spengler, or the following species:

Solen lappeanus Dunker, Moll. Marina, 1858, is said to be from the Antilles, but has not been reported from that region by anyone else. Externally it is not unlike *S. viridis* Say.

Aulus (=*Siliqua*) *rostratus* Dunker, 1861, figured by Sowerby, Conch. Icon., 1874, is said to be from the Arctic Ocean, but this is certainly erroneous. *Solen radiatus* Linnæus, appears in Pfeiffer's list of Cuban shells,[1] but the shell intended was very likely *Tagelus divisus* Spengler. No species of *Siliqua* is known from Cuba.

Krebs cites *Machæra lucida* "Gould," from Mörch's Yoldi catalogue, as Central American; but this is doubtless *M. lucida* of Conrad, from the Pacific coast of Central America.

There is no large species of *Ensis* on the west coast of America corresponding to the *E. magnus* and *E. directus* of the northern Atlantic, though the *E. californicus* is the exact analogue of the European *E. ensis* and the east American *E. minor*. Among the Siliquas on the two sides of the continent *S. alta* and *S. squama*, *S. media* and *S. costata*, are respectively analogous, while *S. lucida* finds its counterpart in the *S. pulchra* of Japan.

SOLEN MEXICANUS, new species.

Shell small, straight, parallel-sided, with anterior beaks, the anterior end obliquely truncate; the posterior end squarely truncate with the corners slightly rounded off; hinge with the teeth normal, the ligament unusually long in a very narrow groove; shell white, covered with a polished olivaceous epidermis, longitudinally striate near the ventral edges of the valves. Length of shell, 60 mm.; of ligament, 11 mm.; width of valves, 8.5 mm.; diameter, 5.5 mm.

Type.—No. 120634, U.S.N.M. Specimen from the Gulf of Tehuantepec.

This species recalls the *Solen linearis* of Chemnitz, which, however, is considerably longer in proportion to its width.

ENSIS CALIFORNICUS, new species.

Shell small, slender, arcuate, the sides nearly parallel, the valves being slightly attenuated toward the ends, beaks anterior, the anterior truncation bluntly rounded, the posterior similar; color white with livid pink streaks concentrically disposed; epidermis olivaceous brilliantly polished; hinge with small and very delicate cardinals (usually broken off), one in the right and two in the left valve, the dorsal ridge comparatively strong and elevated, shorter than the ligament. Length of shell, 60 mm.; of dorsal tooth or ridge, 5.2 mm.; of ligament, 9 mm.; width of shell, 7 mm.; perpendicular to the chord of the arc formed by the dorsal margin of the valves, 2 mm.

Type.—No. 158891, U.S.N.M. Specimen from 14 fathoms sand, off the island of San Pedro Martir, Gulf of California. Some specimens reach a length of 85 mm.

This species recalls small specimens of the east American *E. minor*, which, however, differs by being wider distally than in front, larger when adult, with proportionately wider and more arcuate valves.

[1] Archiv für Naturgeschichte, 1840, p. 261.

In this connection I may add some supplementary data to my "Synopsis of the Psammobiidæ,"[1] which have come to hand since that article was printed.

Tagelus gibbus Spengler, as typically restricted, passes as far south as St. Thomas, West Indies, and probably to the northeast shores of Brazil. The variety called *T. platensis* by d'Orbigny differs by being shorter and more attenuated behind, and I have seen it only from the southern coast of Brazil and Uruguay. In all the typical species of *Tagelus* the posterior end is shorter than the anterior, the pallial sinus is deep, reaching to or forward of the perpendicular from the umbones, and the posterior adductor scar is rounded. The teeth are simple, erect, pedunculated, two in each valve. There is no central constriction or internal rib. Curiously enough, the shell figured by H. and A. Adams to illustrate *Tagelus* (or *Siliquaria*) *gibbus* is a *Novaculina*, while they describe the teeth as 3:2 (which is the dentition of *Novaculina*) and the sinus as deep beyond the umbones, which belongs to *Tagelus* and is untrue of *Novaculina*.

Owing to the fact that a number of externally similar but really different shells have been confused, the diagnoses of these groups are frequently inaccurate, and I have therefore reviewed the question in the light afforded by the specimens. The following are the characters:

Genus NOVACULINA Benson, 1830.

Type.—N. gangetica Benson.

Beaks subanterior; teeth (when fully developed) three in the left and two in the right valve; the anterior left tooth often obsolete or wanting, the anterior right tooth bifid; there is no median constriction, the pallial sinus is small, not reaching the beaks, the posterior adductor scar rounded; the scar of the ventral side of the sinus not coalescent with the pallial line below it; situs in fresh water.

Section CLUNACULUM Dall.

Type.—Solecurtus mollis (Gould) Sowerby, Conch. Icon. *Solecurtus*, 1874, pl. VI, fig. 26; coast of Brazil and Uruguay.

Valves obliquely constricted, the constriction reflected by an internal thickened elevation (not a clavicle); beaks subanterior; teeth, two in the left and two in the right valve, the posterior left tooth bifid, in some of the species there is an obsolete tooth behind it; the pallial sinus not reaching the beaks, the posterior adductor scar triangular, the scar of the sinus coalescent ventrally with the pallial line; situs marine.

Genus TAGELUS Gray, 1847.

Type.—Solen gibbus Spengler.

Valves not constricted and without a clavicle; beaks medium or subposterior; teeth simple, pedunculate, two in each valve; pallial sinus

[1] Proc. Acad. Nat. Sci. Phila., 1898, pp. 57-62.

deep, reaching to or beyond the beaks, posterior adductor scar rounded, the scar of the sinus coalescent ventrally with the pallial line; situs estuarine or marine.

Section MESOPLEURA Conrad, 1867.

Type.—*Solen divisus* Spengler.

Valves arcuate, not constricted, but with a more or less perfectly developed clavicular rib extending ventrally from the submedian beaks, otherwise as in *Tagelus*.

Gray in 1854 included species of *Clunaculum* under *Novaculina* as well as some species of true *Tagelus* like *T. dombuji*. I have not been able to examine all the described species, but *Solen constrictus* Lamarck, certainly, and probably *S. inequalis* and *S. complanatus* Sowerby, belong to *Clunaculum*.

TAGELUS POEYI, new species.

Shell resembling a young *T. gibbus*, but with more equal and evenly rounded ends, the beaks median, the teeth slender, long, but quite small, the nymphs for the ligament shorter and more central, the whole of the ventral side of the pallial sinus coalescent with the pallial line. Shell white, covered with a pale ashy gray, dehiscent epidermis; the anterior dorsal margin slightly decurrent. Length, 50 mm.; altitude, 18 mm.; diameter, 11.5 mm.

Types.—No. 27425, U.S.N.M., from Cuba (Poey); also from mouth of Old River, Belize (Stanton); beach at Greytown, Nicaragua (Dall); and Rio Grande do Sul, Brazil (Ihering).

This species can be instantly distinguished from *T. gibbus* by the different form of the pallial sinus and the different position of the beaks. It does not appear to attain more than half the size of the full grown *T. gibbus*.

Specimens of *T. gibbus* collected at Matagorda Bay, Texas, by Singley, of a light but distinct yellow color, are in the national collection, and more recently Hon. J. D. Mitchell has sent specimens, of which he has several in his collection, of a decided pink color, from the same vicinity. Both form a decided contrast to the white or slightly ferruginous tint of the average specimens of this species.

THE OSTEOLOGY AND RELATIONSHIP OF THE PERCOIDEAN FISH, DINOLESTES LEWINI.

By EDWIN CHAPIN STARKS,

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As a preliminary to this paper I will quote a paragraph from a paper by Dr. Theodore Gill, "On the identity of *Esox lewini* with the *Dinolestes mülleri* of Klunzinger," published about twenty-five years ago in the Annals and Magazine of Natural History. In it he gives the following concise history of *Dinolestes:*

In the tenth volume ("the class Pisces") of the "Animal Kingdom" of Cuvier, edited by Edward Griffith (1834), are a figure (plate 60) and a brief notice (p. 465) of a fish which has long been a puzzle to me. It is called *Esox lewini* and only noticed as follows: "Our figure of *Esox lewini* is from a drawing by Mr. Lewin, made in New Holland, of a species not hitherto noticed." It was evident that the species thus named belonged neither to the genus *Esox* nor anywhere near it; and (1) the relations of the fins, (2) the position of the ventrals with a spine and five rays each, (3) the form of the head, and (4) the teeth indicated for it affinity to *Chilodipterus* and allied forms; but no first dorsal fin was represented. The question then arose whether that fin had been atrophied (as in *Aspidophoroides, Gobiopus*, etc.) or (as was more likely) had been overlooked. After nearly forty years the species has been recovered, and singularly enough, after having escaped the observation of the numerous collectors in the Australian seas for so long a time,[1] has in the same year been obtained and described by three different naturalists under as many names, viz, *Dinolestes mülleri* by Klunzinger, *Neosphyræna multiradiata* by Castelnau, and *Lanioperca mordax* by Günther. There can be no question about at least the generic identity of the *Esox lewini* with the fishes described by the three contemporaries; and it now appears that the first dorsal fin exists, but is quite small, and sustained by only four or five spines. Klunzinger and Castelnau refer the type to the family Sphyrænidæ, and Günther (with more justification I think) to the "Apogonina," i. e., Chilodipteridæ.

This work was undertaken at Dr. Gill's suggestion in the hope of finding, in a comparative study of the skeleton of *Dinolestes* with those of the Sphyrænidæ and the Cheilodipteridæ, some characters that

[1] It is said, however, by Castelnau to be common [at Melbourne] in the months of May, June, and July; it attains 2 feet in length. The fishermen call it "Ship Jack," but that name is more particularly applied to *Temnodon saltator.*

would decide the question on which the authorities disagreed, as shown in the last sentence quoted from the above paper.

It would appear an easy matter to place this form under one or the other of two families arranged in different suborders, as the Sphyrænidæ and Cheilodipteridæ usually are: but the fact that two of the authorities consider it under one family and two under the other, indicates how close the resemblance must be to either.

Sphyræna argentea is the form chosen to represent the family Sphyrænidæ, while the only representative procurable of the Cheilodipteridæ was *Apogon maculatus*.

The skeleton of *Apogon* was found to be of but little assistance in this comparison. Though being undoubtedly Percoid, it differs as much from *Dinolestes* as they both differ from the more generalized Percoids, such as the bass or perch. Considering the difference between *Dinolestes* and *Apogon* in external appearance, we have probably little reason to expect the internal resemblance to be otherwise. Perhaps if one of the *Sphyræna*-like Cheilodipteroids could be examined there would be a closer resemblance.

To be sure *Dinolestes* differs from *Apogon* only in shape and comparative size of elements (that is, comparative between corresponding elements of each species), and not in arrangement, or lack or possession of elements; but it is so very different in shape of cranium, form of body, and shape of fins that it would seem better to consider the Cheilodipteroid side of the question partly by considering the Percoid fishes more or less as a whole. Though, of course, if it is placed with the Percoids it is only under the family Cheilodipteridæ, as the Percoids are now arranged, that *Dinolestes* could be admitted.

Were it not that the ventrals of *Dinolestes* are apparently thoracic, it might appear after a superficial external examination to be related to *Sphyræna*. The long head, projecting lower jaw, fanglike teeth, and elongate preorbital region are very *Sphyræna*-like. The shape of the body and dorsal fins are also suggestive of that relationship.

In internal characters we find that the ethmoid is wide and flat, somewhat overlying the vomer and prefrontals instead of being interposed between them. This is the condition found in *Sphyræna*. The nasals are very much like those of *Sphyræna*, being long and channeled and attached by their sides to the ethmoid for nearly their whole length. This, however, is probably caused by the elongate snout, and goes with it as a part in keeping with the surrounding conditions. It disposes of the characters by which an alliance with *Sphyræna* could be proved.

Though the shape of the body and head, the canine teeth, and dorsal fins exhibit perhaps a closer superficial resemblance to the Sphyrænidæ than to the Cheilodipteridæ, there are forms to be found in the latter family which approach this *Sphyræna*-like appearance also. These characters therefore denote nothing in favor of either relationship. The characters of the ethmoid and nasals are the only characters possessed by *Sphyræna* in common with *Dinolestes* that are not also shared

in by members of the family Cheilodipteridæ. They are of no great importance.

This, as has been said, is without considering the position of the ventrals. As the Percoid fishes have thoracic ventrals, and the members of the suborder Percesoces, under which the Sphyrænidæ is placed, have abdominal ventrals, it is difficult to see how *Dinolestes* could have been thought to be related to *Sphyræna* unless the ventrals were interpreted as being abnormally anterior abdominal ventrals. The ventrals, however, prove to be typical thoracic ventrals with the anterior point of the pelvic girdle interposed and attached between the opposing clavicles near their lower end above their symphysis. Anterior abdominal ventrals might have the point of the pelvic girdle touching the clavicles or even extending slightly under them, but never interposed between them.

Another character that refutes the Sphyrænoid relationship of *Dinolestes* is the lack of the long processes developed backward from the epiotics and supraoccipital crest, which are possessed in a greater or less degree by all the Percesoces and reaches its greater development in *Sphyræna*.

A more important difference is the structure of the teeth. Though both *Dinolestes* and *Sphyræna* have large backward-directed canines, they are entirely different in the way in which they are attached to the bone of the jaw. The calcified tooth substance of the teeth of *Dinolestes* reaches only to the bone, where it is anchylosed or so incorporated with the bone as to make it difficult to distinguish the line of junction. This attachment is effected by what Tomes calls "bone of attachment." A substance resembling cement, but unlike true cement, is developed from the periosteum rather than from the dental capsule. Such teeth may be developed from sockets, but as the calcified tooth substance is pushed out the cavity behind fills with the bone of attachment and becomes obliterated. The dentine never extends into a cavity of the bone in the mature tooth. This is a Percoid character.

The teeth of *Sphyræna*, on the other hand, are set in sockets. The attachment of teeth in alveoli is of such rare occurrence among fishes and must be so deep seated that we can hardly interpret it as less than a family character. Mr. W. G. Ridewood, in a paper,[1] has this to say in regard to this class of teeth:

> The tooth and bone are in organic continuity by means of a periosteal layer common to the tooth and the jaw; and this layer may remain uncalcified so that the teeth can be pulled out of their sockets, as in some Caracinoid fishes; or "bone of attachment" may, except in young teeth, anchylose the tooth to the wall of the socket, e. g., *Sphyræna*.

But whether or not the tooth becomes cemented in, the enamel and dentine extend into a cavity and do not become incorporated with the bone.

[1] Natural Science, VIII, June, 1896, p. 383.

There is also a difference in the shape of the teeth of *Sphyræna* and *Dinolestes*. Those of the former are lancelike—that is, compressed laterally and with cutting edges. Those of the latter are round in transverse section.

The vertebræ of *Dinolestes* are typical, or in general resembling the Percoids and most bony fishes in that they are of moderate length and not much constricted in the middle. They have parapophyses developed behind the fourth vertebra, two pits on the side of each vertebra separated by a longitudinal ridge, and the abdominal vertebræ with a pit on the ventral side with ridges on each side of it. The vertebræ of *Sphyræna* are long and smooth with scarcely any pits, much constricted in the middle, making them hourglass shaped, and with only one or two pairs of parapophyses.

The shape of the cranium of *Dinolestes* is also more typically Percoid in appearance than Sphyrænoid with the slightly rising supraoccipital crest and more wedge-shaped lateral view.

A recapitulation with these points condensed will show at once the affinity of *Dinolestes* to the Cheilodipteridæ.

1. The Percoid appearing cranium.
2. The thoracic ventrals.
3. The anchylosed teeth rather than teeth in sockets.
4. The character of the vertebræ, typical; not specialized as in *Sphyræna*.
5. The lack of the long posterior processes from the epiotics.

These conclusions are fortified by the following description.

DINOLESTES LEWINI.

Esox lewini GRIFFITH (?), Cuvier's Animal Kingdom, Griffith ed., X (1834), p. 465, pl. 60.

Dinolestes mülleri KLUNZINGER, Archiv für Nat., 38. Jahrg. I (1872), p. 30; Hobson Bay, South Australia.

Neosphyræna multiradiata CASTELNAU, Proc. Zool. and Acclim. Soc. Victoria, I (1872), p. 96; Melbourne.

Lanioperca mordax GÜNTHER, Ann. and Mag. Nat. Hist., 4th ser., X, (September, 1872), p. 183; Tasmania.

Dinolestes lewini GILL, Ann. and Mag. Nat. Hist., 4th ser., XIV (1874), p. 160.

DIAGNOSIS.

Body rather elongate; preorbital region produced; mouth large, the lower jaw projecting; canine teeth on lower jaw posteriorly and on premaxillaries at their symphysis; sharp, cardiform teeth in a single row on jaws, vomer and palatines; an inner row of villiform teeth on premaxillaries; three toothed superior pharyngeals; lower pharyngeals rather narrow, separate; gill rakers long and slender, about 4 + 13; opercles without spines or ridges; branchiostegals 7; maxillary with supplemental bone; nasals elongate, attached by their sides for nearly their whole length; parietals separated; ethmoid somewhat overlying prefrontals and vomer; posttemporal forked; postclavicle of two parts;

basisphenoid with a descending process; myodome present with a small pore to the exterior posteriorly; no suborbital shelf; vertebræ 27; parapophyses present on all abdominal vertebræ except first 3; scales cycloid; maxillaries, cheeks, opercles, and lower jaw with scales; lateral line straight, running well out on base of caudal, scales along its course systematically crowded; base of anal, soft dorsal, and caudal with small scales; anal with 2 spines and about 25 rays; dorsals remote, the first of about 5 slender spines, the second with 1 spine and about 18 rays; ventrals with 1 spine and 5 rays each; interspinous bones not extending between vertebral spines.

OSTEOLOGY.

Cranium, as viewed from above, rather elongate and narrow. Interorbital region a flattish area with the sides nearly parallel the greater part of its length, occupying at least a third of length of cranium. Preorbital region elongate, not tapering till near end, occupying another third of length of cranium. Region surrounding foramen magnum slightly produced. Lateral view of cranium tapering rather regularly to vomer.

Supraoccipital interposed between exoccipitals nearly to their posterior ends; its crest developed superiorly and posteriorly, scarcely extending past exoccipitals posteriorly.

Exoccipitals broadly meeting above basioccipital, entirely surrounding foramen magnum.

Parietals widely separated. by supraoccipital, not extending over epiotics.

Epiotics with scarcely any process.

Prootics, opisthotics, sphenotics, and pterotics typical; that is, Percoid-like.

Alisphenoids widely separated. The anterior opening into brain case large.

Basisphenoid present; a foramen between it and basis cranii. A slender process descending from it and attached to parasphenoid.

Myodome present; opening to the exterior at its posterior end through an extremely small foramen.

Parasphenoid spreading out wide posteriorly.

Vomer bearing sharp short teeth in a single row around its anterior edges. Teeth becoming smaller anteriorly.

Prefrontals large and rather elongate, the olfactory foramen scarcely behind middle.

Ethmoid entirely superior to prefrontals and vomer, widely overlying them and extending to edge of rostrum. A raised area along its middle.

Nasals thin elongate rods of bone attached by their sides to ethmoid for nearly their whole length; their length over a fourth that of cranium.

Preorbital longer than wide; its outline triangular.

Suborbital ring of the usual number of five bones with a sensory canal through them. No suborbital shelf.[1]

Opercle without ridges or spines on outer surface. On inner surface a sharp horizontal ridge runs posteriorly from its condyle with hyomandibular.

Subopercle extending around lower corner of opercle, upward and backward, forming lower part of posterior opercular angle.

Interopercle very broadly attached to subopercle at its upper posterior side.

Preopercle with ridge and sensory canal as usual.

Lower limb of hyomandibular rather long and rod-like.

Palato-pterygoid process very long and stout. A single row of small teeth along lower edge extending anteriorly upon a process beyond main part of palatine somewhat similar to the usual process from upper edge of that bone. Suspensorium otherwise typical.

Lower jaw heavy and long. The articular half as wide as long. Teeth in a single row upon dentary, three or four canines present posteriorly.

Angular present, rather small.

Maxillary with long supplemental bone along posterior edge.

Premaxillary rather slender, much widened at middle into a wide process which extends behind maxillary; its lower end very slender. A single row of elongate pointed or small canine teeth along its edge, largest medially, growing gradually smaller toward each end. Inside of this row a villiform band, widest medially. At upper end of each maxillary are two large canines anchylosed immovably, the posterior pair much hooked back.

Clavicle and hypercoracoid typical, or as in the Percoids.

Hypocoracoid as usual broadly joined at upper end to clavicle and hypercoracoid, thence arching away and touching lower end of clavicle again with a rather slender process. Besides this, from its middle, running through the usual interspace between it and clavicle, is another process flat and thin, but strengthened through its middle, reaching to and joined to clavicle.

Actinosts four, rather short.

Pectoral not nearer upper end of clavicle than is usual in the Percoids, its upper ray working directly upon hypercoracoid.

Postclavicle in two parts, the inferior very long.

Supraclavicle of moderate length.

Post-temporal widely forked; its articulation with skull typical.

Inferior hypohyal scarcely visible on outer surface of hyoid arch, being covered by superior hypohyal, which forms the greater part of front of arch. Hypohyals of about equal size on inner surface of arch.

Ceratohyals, ephyals, and interhyals typical.

[1] Suborbital shelf: a small shelf of bone extending inward from the suborbital ring and conforming to the rotundity of the eyeball. Possessed by many of the higher bony fishes.

Branchiostegals seven, four being borne by ceratohyal and three by epihyal; the three anterior ones attached to inner surface of hyoid arch.

Glossohyal wide, flat, or slightly concave above.

Urohyal elongate, thin, without double heel below, except at extreme anterior end.

Basibranchials three—the first not supporting any arch, the second supporting the first arch, and to the third the second and third arches are joined. No ossified basibranchial to fourth arch.

Epibranchials of third arch meet behind last basibranchial; epibranchials of fourth arch absent.

Suspensory pharyngeals present on first arch.

Superior pharyngeals three in number, that is, on second, third, and fourth arches; the second largest, and with the third forming an elongate patch.

First two interspinal rays of dorsal and of anal not coalesced. None of the interspinals interposed between neural or hæmal spines.

The interval between first and second dorsals occupied by two free auxiliary interneural spines.

First interhæmal spine not enlarged or in any way differentiated from its fellows. Interhæmals equally graduated from behind forward.

Ventral fins truly thoracic. The pelvic girdle long and tapering to a slender point, which is interposed between the clavicles above their union.

The vertebral column composed of 10 abdominal and 16 caudal, which, with the usual hypural, number 27 vertebræ.

Superior zygapophyses both posteriorly and anteriorly present, but small, as is usual in the Percoid fishes.

Inferior zygapophyses well developed posteriorly near middle of column; anteriorly scarcely discernible.

Parapophyses developed on fourth and succeeding abdominal vertebræ, growing larger posteriorly; the last pair connected near their bases by a bridge of bone.

Hypural assisted in supporting caudal fin by spines from two preceding vertebræ.

Ribs and epipleurals typical.

EXPLANATION OF PLATES.

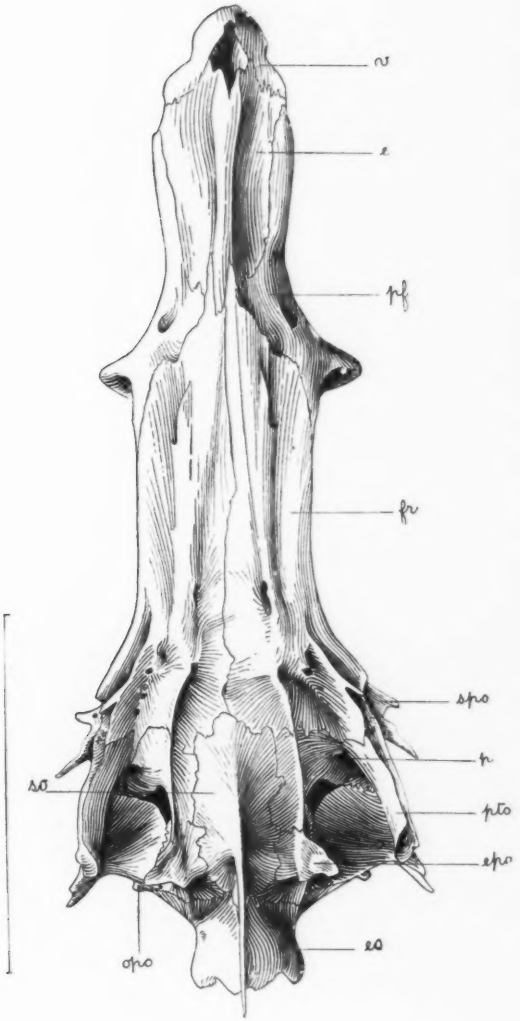
[Drawn by Chloe Lesley Starks.]

Plates VIII, IX, and X, superior, lateral, and posterior views of the cranium of *Dinolestes lewini*, skeleton No. 47877, U.S.N.M., from Port Jackson, Australia.

Plate XI, *Dinolestes lewini*, No. 47929, U.S.N.M., from Tasmania.

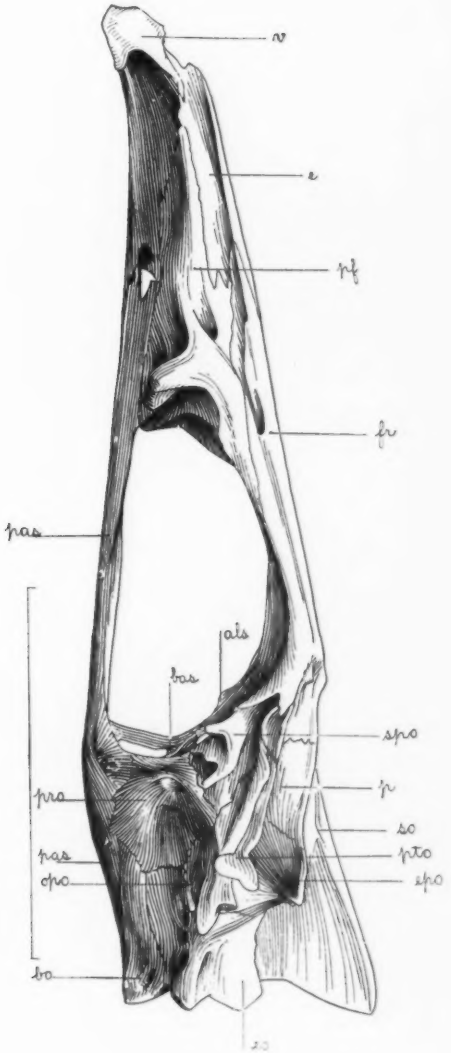
SIGNIFICANCE OF REFERENCE LETTERS USED ON PLATES.

als. Alisphenoid.
bas. Basisphenoid.
bo. Basioccipital.
e. Ethmoid.
eo. Exoccipital.
epo. Epiotic.
fr. Frontal.
opo. Opisthotic.
p. Parietal.
pas. Parasphenoid.
pf. Prefrontal.
pro. Prootic.
pto. Pterotic.
so. Supraoccipital.
spo. Sphenotic.
v. Vomer.



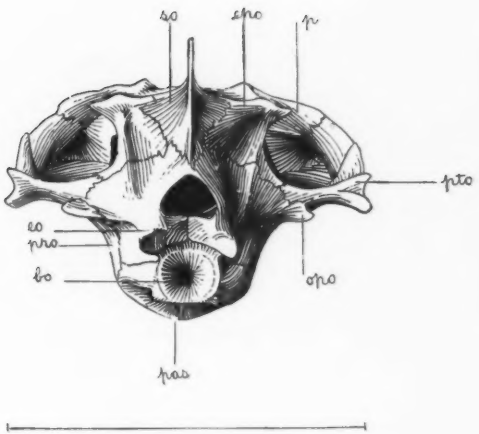
SUPERIOR VIEW OF CRANIUM OF DINOLESTES LEWINI.

FOR EXPLANATION OF PLATE SEE PAGE 120.



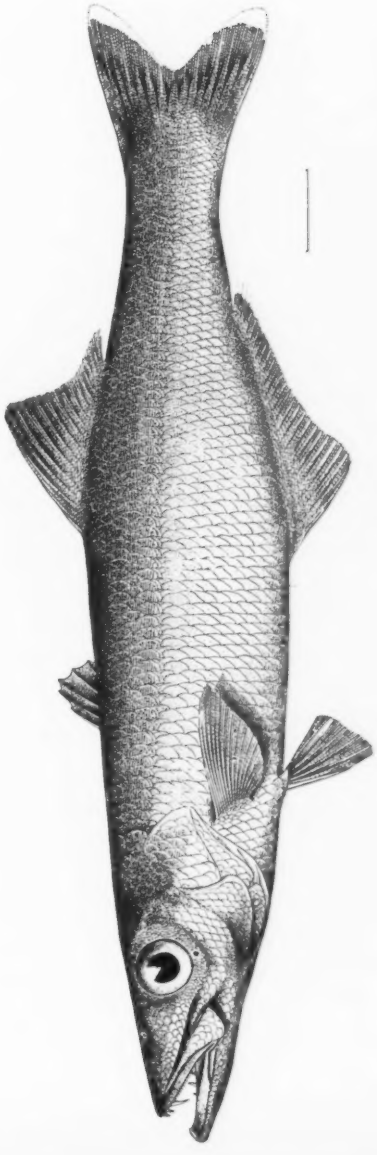
LATERAL VIEW OF CRANIUM OF DINOLESTES LEWINI.

FOR EXPLANATION OF PLATE SEE PAGE 120.



POSTERIOR VIEW OF CRANIUM OF DINOLESTES LEWINI.

FOR EXPLANATION OF PLATE SEE PAGE 120.



DINOLESTES LEWINI.

FOR EXPLANATION OF PLATE SEE PAGE 120.

DESCRIPTION OF TWO NEW SPECIES OF CRAYFISH.

By W. P. Hay, M. S.,
Central High School, Washington, D. C.

In working over the large collection of the Astacidæ in the possession of the U. S. National Museum the following new species have come to my notice:

CAMBARUS PILOSUS.

Type locality.—Beloit, Mitchell County, Kansas.

Type.—No. 19761, U.S.N.M.

Male, form I, not known.

Male, form II, rostrum of medium width, long, deeply excavated, with sharp, raised, slightly converging margins; lateral teeth well developed, acute; acumen long, slender, acute, nearly straight. Postorbital ridges grooved on their outer face; anterior spines small, acute. Carapace smooth and lightly punctate above, very finely granulate on the sides; anterior border not angulated and with a well-developed fringe of cilia extending along the lower side of the rostrum and around beyond the minute branchiostegian spine; cervical groove deep, sinuate, broken on the sides above the small lateral spine; areola narrow. Abdomen longer than the cephalothorax, telson rounded behind, anterior segment with two spines on each side of the posterior border. Second and third basal segments of the antennæ with well-developed, acute, external spines. Antennal scale a little longer than the rostrum, outer margin slightly concave, apical spine acute and rather long; tip concave, inner margin rounded. Epistoma subtriangular, the margins convex. Third maxillipeds hairy on their inner and outer faces. Chelipeds short; chelæ of moderate width, punctate above, nearly smooth

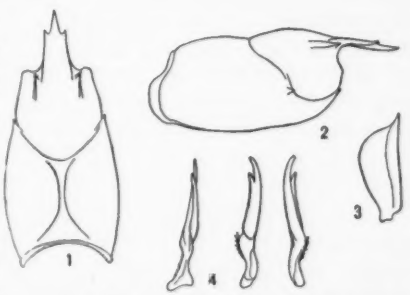


Fig. 1.—Nos. 1, 2, carapace; No. 3, antennal scale; No. 4, first abdominal appendages of male, form II.

and sparsely ciliate below; upper surface near the inner margin and both fingers thickly ciliate; inner border of hand short, serrate, the serrations hidden by the cilia; outer margin of hand ribbed; movable finger serrate and ciliate on outer margin; both fingers ribbed on upper surface and bearded at base on inner margins, the beard being most dense on the outer finger. Carpus triangular, lightly grooved above, ciliate along the distal margin; a small spine at the superior internal angle and behind it a few very minute denticles, inner surface heavily bearded along the distal margin; median spine large and curved strongly forward; distal border beneath ciliate, and with three well-developed, acute spines. Distal margin of meros bearded above and within, two small spines above at the distal end; beneath, of the usual two rows of spines, the outer row is represented by two or three strong spines, the inner by a row of small teeth; between the rows there is, in some specimens, a ciliated patch. Third pair of legs hooked. First pair of abdominal appendages of medium length, reaching forward to the middle of the basal segments of the second pair of legs, very slender and bifid for only a short distance from the tip; inner branch considerably shorter than the outer, the tip acute and turned slightly backward and outward across the outer branch, the tip of which is compressed and recurved.

Female.—Not known.

Seven specimens, the largest nearly 2 inches in length.

In some respects this species resembles quite closely *Cambarus naïs* Faxon, from the same region. I have not been able to compare Dr. Faxon's types with the species here described, but as his description makes no mention of the heavily ciliate chelipeds, a character which could not have escaped his observation, and fails to agree in other respects, I feel no hesitation in considering the specimens from Beloit representatives of a new species.

CAMBARUS CLYPEATUS.

Type locality.—Bay St. Louis, Mississippi; U. S. Biological Survey, collector, 1892.

Type.—No. 22778, U.S.N.M.

Male, form I, not known.

Male, form II, not known.

Female.—Rostrum long, very broad, flat, hardly at all excavated, sides slightly raised, sharp, diverging slightly from the base to about the middle, then converging to near the tip where they abruptly turn in to the middle line; the tip of the rostrum is round, and the usual lateral teeth are not represented, even by angles. Postorbital ridges short, grooved on outer face, anterior spines wanting. Carapace smooth and polished above, lightly punctate on the sides, anterior margin hardly angulated; cervical groove sinuate, broken on the sides; lateral spine wanting; branchiostegian spine minute; areola wide.

Abdomen longer than the cephalothorax; pleuræ punctate; telson rounded behind, anterior segment with four or more spines on each side of the posterior border. Antennæ shorter than the cephalothorax; antennal scale shorter than the rostrum, broadest near the middle, tip convex, inner margin rounded. Epistoma broader than long, sides convex, anterior angle denticulate. Third maxillipeds hairy on their inner faces. Chelipeds moderately strong; chelæ inflated, punctate above and below; inner margin of hand longer than the fingers; outer finger short, nearly straight, inner finger rather strongly incurved at tip; both fingers strongly ribbed above and provided on their cutting edges with two or three large teeth and numerous serrations. Thoracic sternum hairy. Annulus ventralis prominent, subcircular, the wall bituberculate and thin in front, broad and low behind. The fissure is very sharply bent to one side just within the anterior wall and is lost, but an accessory branch, separated by a thin wall from the first, bends back to the middle of the annulus and emerges at the posterior angle. The appendages of the first abdominal somite are not developed.

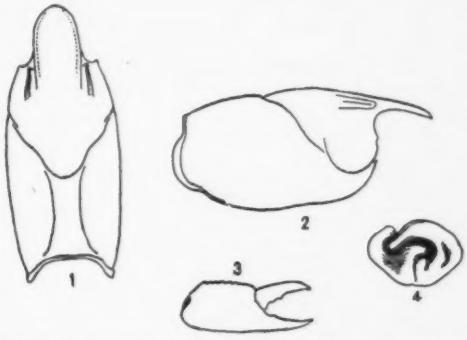


FIG. 2.—NOS. 1, 2, CARAPACE; NO. 3, CHELA; NO. 4, ANNULUS VENTRALIS.

A single specimen about 2 inches in length.

As no specimen of the male of this species has yet been collected, it is impossible to say with certainty where this species belongs. In general appearance it is very unlike any other North American species yet discovered. In the rounded, toothless rostrum and the peculiarly shaped chelæ it resembles somewhat some of the South American Parastacinæ, but the resemblance stops there. The closest relatives will probably be found to be some of the species of the second group of Faxon, and of these *Cambarus cubensis* approaches it most closely in appearance.

CONTRIBUTIONS TO THE NATURAL HISTORY OF THE COMMANDER ISLANDS.[1]

No. XIII.—A NEW SPECIES OF STALKED MEDUSÆ, HALICLYSTUS STEJNEGERI.

By K. KISHINOUYE,

Imperial Fisheries Bureau, Tokyo.

A large number of medusæ, belonging to the very interesting family of Stauromedusæ, were collected by Mr. Leonhard Stejneger at Nikolski, Bering Island, one of the Commander Islands, during the summer of 1897. These medusæ were preserved in formol and still remain in excellent condition. They belong to a single species of the genus *Haliclystus*. So far as I am aware, there are only three known species of this genus, and all of them are from the Atlantic coast. The species, how-

[1] The following "Contributions to the Natural History of the Commander Islands" have been published in these Proceedings thus far: I. Leonhard Stejneger: Notes on the natural history, including descriptions of new cetaceans, XI, 1883, pp. 58–89.——II. Leonhard Stejneger: Investigations relating to the date of the extermination of Steller's Sea-Cow, VII, 1884, pp. 181–189.——III. W. H. Dall: Report on the mollusca of the Commander Islands, Bering Sea, collected by Leonhard Stejneger in 1882 and 1883, VII, 1884, pp. 340–349, pl. II.——IV A. Asa Gray: Notes upon the plants collected on the Commander Islands (Bering and Copper islands) by Leonhard Stejneger, VII, 1885, pp. 527–529.——IV B. Leonhard Stejneger: Additional notes on the plants of the Commander Islands, VII, 1885, pp. 529–538.——V. Frederick W. True: Description of a new species of Mesoplodon, *M. stejnegeri*, obtained by Dr. Leonhard Stejneger, in Bering Island, VIII, pp. 584, 585, pl. XXV.——VI. W. H. Dall, Report on Bering Island mollusca collected by Mr. Nicolas Grebnitzki, IX, 1886, pp. 209–219.——VII. Leonhard Stejneger: Revised and annotated catalogue of the birds inhabiting the Commander Islands, X, 1887, pp. 117–145, pls. VII–IX.——VIII. George Vasey: Description of *Alopecurus stejnegeri*, a new species of grass from the Commander Islands, X, 1887, p. 153.——IX. W. Lilljeborg: On the Entomostraca collected by Mr. Leonhard Stejneger on Bering Island, 1882–83, X, 1887, pp. 154–156.——X A. Leonhard Stejneger: Contributions to the history of Pallas's Cormorant, XII, 1889, pp. 83–88.——X B. F. A. Lucas: Description of some bones of Pallas's Cormorant (*Phalacrocorax perspicillatus*), XII, 1889, pp. 88–94, pl. II.——XI. F. A. Lucas: The cranium of Pallas's Cormorant, XVIII, 1895, pp. 717–719, pls. XXXIV, XXXV.——XII. Tarleton H. Bean and Barton A. Bean: Fishes collected at Bering and Copper islands by Nikolai A. Grebnitzki and Leonhard Stejneger, XIX, 1896, pp. 237–251.

ever, differs in many points from those already known, and it is so far the only representative of the genus *Haliclystus* found on the Pacific coast.

HALICLYSTUS STEJNEGERI, new species.

Type.—No. 18942, U.S.N.M.

Habitat.—Bering Island, North Pacific Ocean.

The medusa is funnel-shaped and has a rather short peduncle. The largest specimen of the collection is 18 mm. in height (including the peduncle) and 18 mm. in diameter. The peduncle is 5½ mm. in height and 2½ mm. in breadth. I shall give a short description of such larger specimens.

The preserved specimens are grayish or pale brown, semitransparent, with a dark brown or nearly black streak at the umbrella margin and

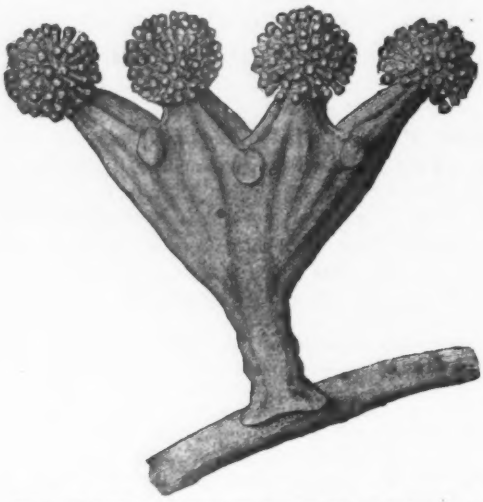


FIG. 1.—HALICLYSTUS STEJNEGERI, NEW SPECIES. SIDE VIEW. × 4.
Drawn by K. Kishinouye.

each perradial corner of the peduncle (figs. 1, 2). Besides these there are 16 radial streaks of the same color (fig. 1). Each two of these 16 streaks are paired along the adradii, and each two adradial pairs unite together in turn at the perradii at the junction of the umbrella (sometimes called the calyx) and the peduncle. These dark streaks are found in the exumbrella. In the subumbrella, too, a dark streak is found at each perradial edge of the œsophagus, and moreover there are pigment cells around the genital sacs. In all these cases the pigment is found in endoderm cells.

The umbrella, or the so-called calyx, is funnel-shaped or conical, gradually increasing in breadth from the peduncle to the umbrella margin. The breadth of the umbrella is one and one-third to one and one-half times as long as its height.

The peduncle is nearly quadrate in cross section. It is about half the length of the umbrella. It has four interradial longitudinal grooves which are formed by the attachment of the tæniola (fig. 1). These tæniola meet at the longitudinal axis and divide the internal space of the peduncle into four chambers. The demarcation between the umbrella and the peduncle is distinct.

The exumbrella is smooth, without prominent ridges or groups of nematocysts. The gelatinous layer is equally thin everywhere and firm in consistence. In the subumbrella we find a few small groups of nematocysts at the perradial sinuses of the umbrella margin only.

The muscle plates are as in other species. The perradial muscles are more weakly developed than the interradial. The four interradial infundibular deepenings nearly reach the junction of the umbrella with the peduncles.

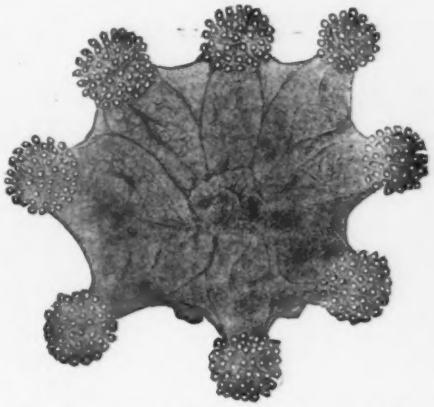


FIG. 2.—HALICLYSTUS STEJNEGERI, NEW SPECIES. VIEW FROM THE OVAL SIDE. × 3¼.
Drawn by K. Kishinouye.

The umbrella margin is cut into eight adradial arms, which are equal in size and equally distant from each other (fig. 2). The depth of the incisions is about half the length between a principal tentacle and the peduncle. Each arm bears a bunch of tentacles, 70 to 100 in number. Tentacles are of equal thickness, but they differ in length. Their length decreases gradually as they approach the periphery of the bunch.

The eight principal tentacles are transformed into adhesive marginal bodies (figs. 1, 2). They are large, sessile, egg-shaped, and about one-half as long as the diameter of the peduncle.

The œsophagus or manubrium (fig. 2) is short, quadrangular, as in other species of *Haliclystus*. Its wall has many longitudinal folds, and its free margin is reflected outward. The eight rows of well-developed gastral filaments extend from the base of the œsophagus to the proximal end of the genital glands.

Genital glands are eight in number, broad and leaf-shaped, tapering at both ends. They extend almost along the entire length of the umbrella. As they are touching each other along the proximal half their length (fig. 2), the subumbrella is almost entirely occupied by them. Each gland consists of 100 to 150 round sacs. These sacs are not arranged in rows. Those nearest to the perradii are larger than the others. We find six to eight sacs abreast at the broadest part of

each gland. Each gland is turned over at the perradial sides and forms a part of the mesentery (fig. 2).

Small specimens (3 to 4 mm. in umbrella diameter) of the collection differ more or less from larger specimens in the proportion of the parts of the body, number of tentacles, and genital sacs, etc. Generally, smaller specimens have the narrower umbrella, longer peduncle, shorter arms shallower umbrella cavity, fewer and not much crowded genital

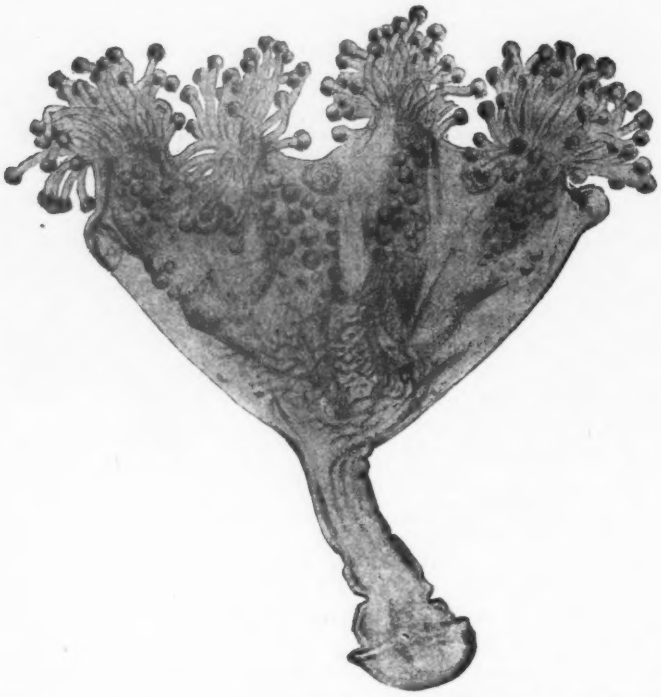


FIG. 3.—HALICLYSTUS STEJNEGERI. AN IMMATURE FORM, 3 MM. IN HEIGHT, DRAWN FROM A PREPARATION IN TRANSMITTED LIGHT.

Drawn by J. Urata.

sacs, and a very little pigment in endoderm epithelium. Moreover, the genital sacs vary in size much more greatly than in larger specimens. The peduncle is not four-chambered. Such differences may be easily understood by comparing figs. 1 and 2 with fig. 3.

Almost all the specimens of the collection were found to contain a number of *Gammarus* in the stomach.

Characteristics of different species of Haliclystus.

Name.	Umbrella.	Peduncle.	Eight arms.	Eight marginal anchors.	Sexual glands.
Haliclystus octoradiatus.	Conical, surface flat, 2 to 3 times as broad as its height.	Cylindrical, almost as long as the height of umbrella; no outward longitudinal grooves.	Equally distant from each other. Each arm with 30 to 60 tentacles.	Large, egg-shaped or nearly club-shaped, one-fourth as long as the breadth of the peduncle.	In each gland 20 to 30 large sacs in two longitudinal rows.
Haliclystus salpinx.	Pyramidal, octangular, much broader than its height.	Quadrangular prismatic, considerably larger than the height of umbrella.	Equally distant from each other. Each arm with 60 to 70 tentacles.	Very large, as long as arms, obliquely trumpet-shaped.	In each gland 40 to 50 sacs in four longitudinal rows.
Haliclystus stejnegeri.	Conical, surface flat, a little broader than its height.	About half as long as the height of umbrella, with four longitudinal grooves.	Equally distant from each other. Each arm with 70 to 100 tentacles.	Large, egg-shaped, half as long as the breadth of peduncle.	In each gland 100 to 150 sacs, 6 to 8 sacs abreast in the broadest part.
Haliclystus auricula.	Pyramidal, octangular, almost as broad as its height.	Almost as long as the height of umbrella, with four deep longitudinal grooves.	United in pairs. Each arm with 100 to 120 tentacles.	Large, shaped like coffee beans, as long as the breadth of the peduncle.	In each gland 100 to 150 sacs in 6 to 8 radial rows.

TOKYO, *May 22, 1899.*

DESCRIPTION OF A NEW SPECIES OF IDOTEA FROM HAKODATE BAY, JAPAN.

By HARRIET RICHARDSON.

Two distinct species were included by Miers[1] with *Idotea ochotensis* Brandt. In a former paper[2] the author has endeavored to define the limits of *Idotea ochotensis* on the one side by preserving the specific distinctions of *Idotea rectilineata* Lockington. It is the object of the present paper to further define the limits of *Idotea ochotensis* on the other side by showing the specific differences of another species, formerly included. Two specimens from Hakodate Bay, Japan, in the collection in the U. S. National Museum, when compared with a large series of *I. ochotensis* from various localities, extending all the way from Kamchatka to Bering Sea and the Aleutian Islands, confirms the impossibility of uniting them with *I. ochotensis*. The specimen which Miers saw in the British Museum collection from Yeddo Island, and which he figures, undoubtedly belongs to the same species as our two specimens from Hakodate Bay. In regard to it Miers says:

> It differs from Brandt's figure of *I. ochotensis* only in its relatively longer and slenderer body and somewhat shorter antennæ, which when retracted would not reach to the posterior margin of the fourth thoracic segment, but whose peduncular joints are longer than in Brandt's figure.

Further on he speaks of the tooth at the distal extremity of the terminal segment as being very prominent in the specimen from Japan. It is probable that Miers had specimens of all three species, the one spoken of obtained at Vancouver Island being *I. rectilineata* Lockington, the specimen from British Columbia being *I. ochotensis* Brandt, and the Japanese specimen the one herein described.

In comparing the species, specimens have been selected which are of nearly the same size, in order to better compare the corresponding parts.

[1] Journal Linnæan Society of London, XVI, 1883, pp. 32–34, pl. 1, figs. 8–10.
[2] Proc. U. S. Nat. Mus., XXI, 1899, p. 845.

IDOTEA JAPONICA, new species.

Body slender, elongated, five times longer than broad, with sides parallel. A dorsal median keel extends the entire length of the body.

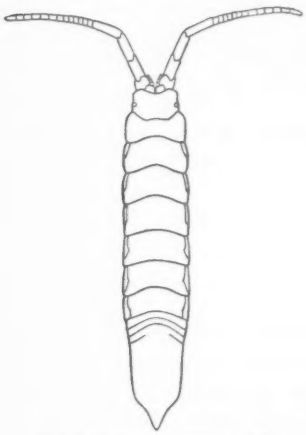


FIG. 1.—IDOTEA JAPONICA. × 2.

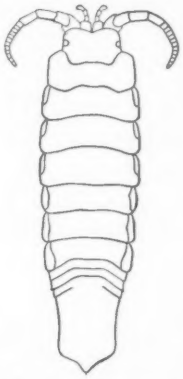


FIG. 2.—IDOTEA OCHOTENSIS. × 2.

Color, brownish yellow.

Head with the anterior margin deeply and roundly excavate and with the antero-lateral angles broadly rounded. Eyes situated on the extreme lateral margin in the median transverse line. The first pair of antennæ reach only a little beyond the second joint of the peduncle of the second pair of antennæ. The second pair of antennæ are half as long as the body, and when retracted would extend to the middle of the fifth thoracic segment; first joint of the peduncle short and concealed by the antero-lateral angles in a dorsal view; second and third joints nearly equal in length; fourth and fifth joints equal in length, and each equal to the second and third taken together; flagellum composed of 14 joints, and shorter than the peduncle.

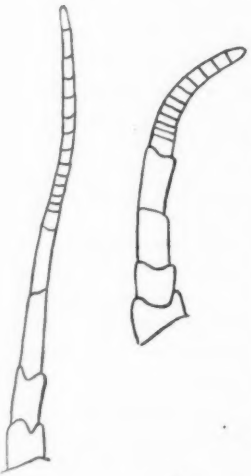
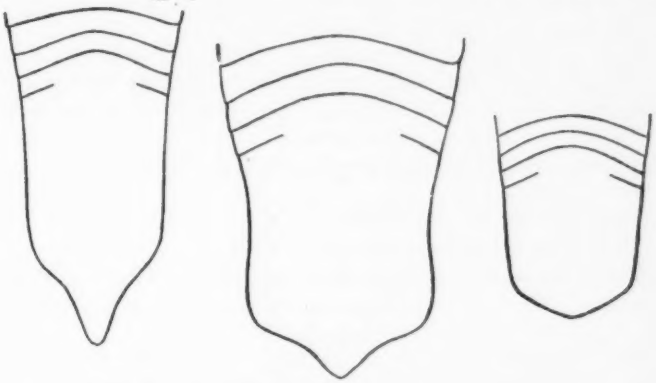


FIG. 3.—*a*, ANTENNA OF SECOND PAIR OF IDOTEA JAPONICA; *b*, ANTENNA OF SECOND PAIR OF IDOTEA OCHOTENSIS. × 8.

FIG. 4.—*a*, OPERCULAR VALVE OF IDOTEA OCHOTENSIS; *b*, OPERCULAR VALVE OF IDOTEA JAPONICA. × 8.

Segments of the thorax about equal in length. First segment with a deep excavation and with antero lateral angles rounded. Epimera narrow; those of the second, third, and fourth segments occupying only the anterior half of the lateral margins; those of the fifth and sixth segments, the anterior two-thirds, and of the seventh segment, the entire margin.

The abdomen (including the terminal segment) is composed of three segments, with suture lines indicative of another partly coalesced segment. The terminal segment, with sides slightly converging, has the



a *b* *c*

FIG. 5.—*a*, ABDOMEN OF IDOTEA JAPONICA; *b*, ABDOMEN OF IDOTEA OCHOTENSIS; *c*, ABDOMEN OF IDOTEA RECTILINEATA. × 8.

apex triangulate and produced much beyond the lateral angles, which are roundly obtuse.

The legs are slender.

Two specimens come from Hakodate Bay, Japan; depth, 8 fathoms in gravel.

Type.—No. 9348, U.S.N.M.

This species differs from *I. ochotensis* Brandt in the following points:

1. The proportions of the body. *I. ochotensis* is stouter and shorter, the relative proportion of breadth and length being 2:7, while in *I. japonica* the body is longer and narrower, the relative proportion being 2:10.

2. The proportionately greater length of the second pair of antennæ.[1]

In *I. ochotensis* the joints of both the peduncle and the flagellum are stouter and shorter and the antennæ extend only to the posterior margin of the third thoracic segment or the middle of the fourth thoracic segment, while in *I. japonica* these joints are longer and more slender, and the antennæ reach the middle of the fifth thoracic segment.

a *b*

FIG. 6.—*a*, LEG OF SECOND PAIR OF IDOTEA JAPONICA; *b*, LEG OF SECOND PAIR OF IDOTEA OCHOTENSIS. × 10.

[1] Although there is some variation in the length of the second pair of antennæ of *Idotea ochotensis*, nevertheless these antennæ are always shorter than those of *Idotea japonica* in specimens of the same size, and the peduncle of the antennæ is also shorter.

3. The form of the antero-lateral angles of the first thoracic segment.

In *I. ochotensis* these angles are markedly truncate, while in the present species they are rounded.

4. The narrower epimera in *I. japonica.*

5. The shape of the terminal segment.

In *I. ochotensis* the lateral margins of this segment are concave, the lateral angles prominent and rectangular, the median posterior tooth or apex not greatly produced, while in *I. japonica* the lateral margins are straight, the lateral angles less prominent and obtuse, and the median posterior tooth or apex greatly produced, being twice the length of that in *I. ochotensis.*

6. The more slender and shorter legs of *I. japonica.*

7. The differently shaped opercular valves.

8. The more slender joints in the first pair of antennæ of *I. japonica.*

LIST OF SHELLS COLLECTED BY VERNON BAILEY IN HERON AND EAGLE LAKES, MINNESOTA, WITH NOTES.

By ROBERT E. C. STEARNS, PH. D.,
Honorary Associate in Zoology.

The species listed below have been received at various times from the United States Department of Agriculture. They form a part of the collection of the United States National Museum, and were collected by Mr. Vernon Bailey, an assistant in the Division of Biological Exploration, in charge of Dr. C. Hart Merriam.

Heron Lake is in southwestern Minnesota, in Jackson County, near the Iowa line. The material from this place was, to quote Mr. Bailey, "scraped up on the beach," in 1887.

Eagle Lake is in Sherburne County. This county is nearer the center of the State, being rather south and east of the center. The collections from both places are small, so far as the number of species is considered, but not without interest, as certain forms, which are commented on at some length, indicate peculiar environmental conditions. These conditions can only be surmised from the material itself, in the place of personal investigation of the lakes and their waters as well as the immediate region in which they are situated. The testimony of the numerous examples of *Planorbis trivolvis* from Heron Lake and *Limnæa emarginata* from Eagle Lake points to considerable fluctuation in the volume of the water one season compared with another, and in the more northerly Eagle Lake to the influence of extreme cold, or alternations of temperature conditions as related to volume of water in some seasons or years, as well as possible alkalinity or some chemical fluctuation due to diminished volume of water at times, or, briefly, to fluctuations in the quantity and temperature of the waters and the chemical quality or proportions in the same.

The Eagle Lake shells were collected in 1891.

LIMNÆA PALUSTRIS Müller.

Heron Lake; a few examples.

LIMNÆA CAPERATA Say.

Heron Lake; infrequent.

LIMNÆA DESIDIOSA Say.

Eagle Lake; two living examples (Cat. No. 123895, U.S.N.M.).

LIMNÆA EMARGINATA Say.

Eagle Lake; abundant. Of the total number of shells from this lake, nine-tenths belong to this species and its varieties, numbering, perfect and imperfect being counted, probably four hundred examples.

A. *Normal form* (Cat. No. 123887, U.S.N.M.); smooth; spire moderately elevated; rather solid and ventricose; columellar fold or twist, rather strong.

B. *Spire short* (Cat. No. 123888, U.S.N.M.); rather thin and ventricose, ranging from young to adult.

C. *Body whorl shouldered above* (Cat. No. 123889, U.S.N.M); spire short to elevated; surface smooth to malleated; solid.

D. *Deeply sutured; spire rather high* (Cat. No. 123890, U.S.N.M.); surface smooth; some individuals marked by strong incremental lines; others inconspicuously lirate; young to adult.

E. *Malleated; obtusely lirate* (Cat. No. 123891, U.S.N.M); in some examples partially obtusely lirate; others showing sharply developed growth lines; spire moderate; shell rather solid; aperture effuse; numerous examples.

F. *Patulous; aperture more or less reflected* (Cat. No. 123892, U.S.N.M); surface smooth or malleated; obtusely lirate in some instances; spire moderate; several examples.

G. *Distorted, bulging* (Cat. No. 123893, U.S.N.M); shells globose or elongated; solid; smooth or malleated; suture deep; aperture in some examples effuse; numerous specimens.

H. *Immature* (Cat. No. 123894, U.S.N.M.); this number and tube includes juvenile examples of many of the foregoing, and other varietal facies.

PLANORBIS TRIVOLVIS Say.

Heron Lake; abundant (Cat. No. 104462, U.S.N.M.). A dwarfed and apparently arrested form of this widely distributed species was obtained in great numbers by Mr. Bailey. The largest individual measured, maximum, only 12.50 mm., while the average of numerous examples is not over 9 mm., maximum. There are two varietal forms, which point to hybridization, suggesting *campanulatus* in one direction and *bicarinatus* in the other. Among 143 perfect individuals, 6 exhibit the abrupt varicose character of aperture so conspicuous in *campanulatus*, and there are many examples that lean toward *bicarinatus*, with a pretty sharp angle on the upper and an obtuse keel on the under side of the whorls. These are registered in the United States National Museum, as follows:

P. trivolvis var. A (Cat. No. 104463, U.S.N.M.).

P. trivolvis var. B (Cat. No. 104464, U.S.N.M.).

PLANORBIS BICARINATUS Say.

Heron Lake (Cat. No. 104465, U.S.N.M.); Eagle Lake (Cat. No. 123897, U.S.N.M.). The 4 specimens from the first-named place are distinctly characteristic; from the last numerous examples were obtained.

PLANORBIS PARVUS Say.

Heron Lake (Cat. No. 104461, U.S.N.M.); Eagle Lake (Cat. No. 123899, U.S.N.M.). From each of the lakes, a few individuals were found in the general mass of material; apparently less common than the larger species.

PLANORBIS CAMPANULATUS Say.

Eagle Lake (Cat. No. 123898, U.S.N.M.); two examples.

PHYSA HETEROSTROPHA Say.

Heron Lake; Eagle Lake (Cat. No. 123896, U.S.N.M.). From the former several examples; from the latter two rather undersized specimens.

PHYSA GYRINA Say.

Heron Lake; a few specimens.

BYTHINELLA OBTUSA Lea.

Heron Lake (Cat. No. 104459, U.S.N.M.); Eagle Lake (Cat. No. 123902, U.S.N.M.). Many examples from each of the lakes, but apparently less frequent than the following:

AMNICOLA CINCINNATIENSIS Anthony.

Heron Lake (Cat. No. 104458, U.S.N.M.); Eagle Lake (Cat. No. 123901, U.S.N.M.). Abundant in Heron Lake, frequently of large size; also common in Eagle Lake.

VALVATA TRICARINATA Say.

Heron Lake (Cat. No. 104460, U.S.N.M.); Eagle Lake (Cat. No. 123900, U.S.N.M.). Exceedingly common and of large size in Heron Lake; the median keel sometimes obsolete. Eight examples from Eagle Lake.

SUCCINEA OVALIS Gould.

Near Heron Lake (Cat. No. 104466, U.S.N.M.). A single example of this terrestial form was detected near the margin of the lake.

SPHÆRIUM STRIATINUM Lamarck.

Heron Lake (Cat. No. 104467, U.S.N.M.); not uncommon.

SPHÆRIUM SOLIDULUM Prime.

Heron Lake; many dead valves.

PISIDIUM COMPRESSUM Prime.

Heron Lake; a single dead valve.

PISIDIUM VARIABILE Prime.

Eagle Lake (Cat. No. 123903, U.S.N.M.); numerous odd valves.

It is presumable that these lakes contain many species not mentioned above. It should be borne in mind that no attempt was made by Mr. Bailey to make an exhaustive collection of the molluscan life in these bodies of water; he simply collected such material as came readily to his hand without interfering with his special work.

DESCRIPTION OF A NEW VARIETY OF HALIOTIS FROM CALIFORNIA, WITH FAUNAL AND GEOGRAPHICAL NOTES.

By ROBERT E. C. STEARNS, Ph. D.,

Honorary Associate in Zoology.

Of the littoral fauna of that long line of coast extending from Point Bonita, on the north side of the entrance to San Francisco Bay, to Cape Flattery, the southerly point of the entrance to the Strait of Juan de Fuca, a stretch of nearly 700 nautical miles, but little is known. The general aspect of the coast throughout most of its extent is broken, jagged, and rocky, with bold abrupt bluffs, against which in ordinary weather the ocean dashes with greater or less violence, and therefore unfavorable to the field work of the naturalist.

There are, however, many reaches of a more inviting character, where the rocky shore dips under the sea with so moderate a slope that the zone uncovered at extreme low tides is of considerable width, often seamed and cut up by narrow furrows and channels, with many shallow pools, and frequently clothed with a heavy growth of bladder weed, altogether presenting a tempting challenge to the collector.

Then there are sandy flats of considerable area, as at Tomales and Bodega, and gravelly beaches occur, of moderate extent, with occasional, sometimes numerous, detached rock masses and bowlders.

While there are many so-called ports, embarcaderos, or landing places between the points above named, especially along the California coast, a large proportion, perhaps one-half or more of the coastwise settlements indicated on the map, consist of small communities incidental to the limited local business. At these places it is often the case there is no harbor, merely a simple roadstead or anchorage, available only in good weather. For the purposes of the collector the immediate neighborhood of many of these places is of trifling importance. The desirable portions of the coast are generally inaccessible by sea and require an outfit for land service, with camp equipage and the usual requisites, with ample appliances for shore work. The best time of the year is the spring, the months of March, April, and May, before the harsh westerly winds begin to sweep in from the sea—usually from the first to the middle of June.

Bolinas, Tomales, and Bodega bays, particularly the first and the adjacent Duxbury reef, being near San Francisco, have been visited by a few collectors, by Colonel Jewett and myself in 1866, and since by Raymond, Hemphill, and Wood, and again by the author, but nothing like thorough work has been done even at these places, the number of species of mollusks usually obtained being from 90 to 100. At Bodega, visited by Dr. Newcomb and myself in 1867, some 90 species were collected. Mr. Hemphill has collected at Fort Bragg and Humboldt Bay, at the latter place securing some interesting forms, including *Paludinella newcombiana*, a new species. On the coast of Mendocino County, nearly thirty years ago, Mr. Harford found near Big Spanish Flat a new *Fusus* (*F. harfordii*). His collection was exceedingly meager, most of his time having been devoted to botany. A visit to Crescent City made by the author in 1862 was a failure so far as shell collecting was concerned, for the beaches and shores in every direction were so piled up with driftwood and the refuse of the great flood of the previous winter as to be absolutely inaccessible. Some little collecting has been done at Coos and Shoalwater[1] bays and at Grays Harbor, on the coast of Washington.

It will be seen from the foregoing that the totality of research throughout this great stretch of coast is quite insignificant. The same may be said in great measure of the biological investigation of the uplands back from and bordering on the shore.

The occurrence of *Olivella intorta* in quantity somewhere along the coast in the neighborhood of Trinidad is implied by the large number of this rare species contained in a necklace[2] obtained from the Hoopa Indians by Lieutenant Ray.

Another peculiar form has recently been added to the few that have been detected in the region herein reviewed.

HALIOTIS FULGENS Philippi var. WALALLENSIS Stearns.

On the coast of Mendocino County, California, in the extreme southwest corner, close to the northerly boundary line of Sonomo County, is an embarcadero, or shipping point of the lumber interests of that neighborhood. Here is situated a small settlement known as Gualala.[3] The coast hereabout is broken and rocky, with bluffs 50 to 100 feet high. In the immediate vicinity of this village Mr. J. J. Rivers some years ago collected the form here described,[4] specimens of which are contained

[1] It may be well to recall what I have elsewhere mentioned, the planting of *Mya arenaria* in Shoalwater Bay by Captain Simpson, of San Francisco. This was some fifteen years ago.

[2] Cat. No. 77185, U.S.N.M., Ethnological department.

[3] Gualala, which is the official post-office name of the village, is a localized corruption of the Indian *Walalla*, which latter, I think, should be perpetuated.

[4] A preliminary description of this variety was published in The Nautilus, No. 9, XII, January, 1899.

in the U. S. National Museum (Cat. No. 98327) and in the museum of the University of California.

The examples in the U. S. National Museum collection were presented to me by Mr. Rivers, and are a part of the original lot. The largest adult is of much smaller size than average full-grown examples of the ordinary form of *H. fulgens*. My examination of the entire series collected by Mr. Rivers suggested the European *H. tuberculata* of the Channel Islands. There is a Japanese species figured in Reeves's Conchologia Iconica, *H. planata* Sowerby, which it somewhat resembles. As my notes were unfortunately destroyed some years ago, Mr. Dall has kindly furnished the following from the U. S. National Museum examples:

Shell of an oval form, considerably flattened, and with about two and a half whorls; color, dark brick red, with occasional mottlings of pale bluish green; holes, four in the young to six in the adult; sculpture of fine, somewhat irregular spiral threads, crossed by fine, close, slightly elevated, sharp concentric lamellæ, and a few small obscure wavelets which radiate obliquely from the apex; nacre rather pale, with pink and pale-green reflections, but much less deep in color than the typical *fulgens*.

This variety differs from the type in its more elongate and flattened form, its constantly finer, spiral threading, and its paler nacre. The concentric lamellation is sometimes undeveloped on the young shells. It has the same number of holes as the type.

The above may be regarded as the extreme northerly expression of *H. fulgens*, which has not heretofore been credited to any part of the coast north of Point Concepcion. From that point to Gualalla is an immense jump, about 320 nautical miles.

Regarding the number of holes in certain species of *Haliotis*, I find the following in my notes: *H. fulgens*, from Lower California, fifty-six show a total of 326 complete and incomplete, an average of six and a fraction; one example had 8 and five 7 holes. Of *H. rufescens* twenty-four had 87 complete, fifteen showing 60, and nine 27 holes, an average of $3\frac{6}{8}$. *H. cracherodii*, thirty-seven examples gave a total of 236 complete holes, an average of about $6\frac{1}{2}$; one individual had only 2, two had 4, while five had 9, approaching the insular form known as *Californiensis* Swainson. All of the foregoing were adult shells.

The "Abalone fishery" on the west coast has been pursued unceasingly for about thirty-five years. My notebook shows that as long ago as the year 1866 no less than 1,697 sacks, each containing from a bushel to a bushel and a half, were exported to China. At that time, and for many years after, the "dried meats" only were of commercial value, there being but a very limited demand for the shells. Later the shells came into general use for a great variety of purposes, so the fishery has been followed more energetically than ever, with the result that in many places the supply has been nearly exhausted. In certain localities where the principal species, *Haliotis rufescens*, *H. cracherodii*, and *H. fulgens*, were abundant they are now comparatively scarce. Recently

the attention of the authorities of some of the seaboard counties having been called to the matter, it is likely that before long the fishery will be either prohibited for a term of years or in some way regulated by law. From the little island of Anacapa in the Santa Barbara channel two persons obtained over 2 tons of shells and meats, being their second catch within a few months. Fortunately there are numerous places along the coast that are inaccessible, so there is but little danger of any of the species becoming absolutely extinct.

ON THE LOWER SILURIAN (TRENTON) FAUNA OF BAFFIN LAND.

By CHARLES SCHUCHERT,
Assistant Curator, Division of Stratigraphic Paleontology.

INTRODUCTION.

In the summer of 1897, a number of men took advantage of the Seventh Peary Arctic Expedition to cruise in Arctic seas and to hunt and fish in Baffin Land. The author had the pleasure of meeting these men while on board the steamer *Hope*, and learned that they intended to make a whale-boat trip to the head of Frobisher Bay. As many Lower Silurian fossils had been seen by Hall during his exploration of this bay, the author requested the Baffin Land party to search for fossils. On the subsequent return of the steamer *Hope* from North Greenland, it was a great surprise to find that Messrs. J. N. Carpender, R. W. Porter, A. V. Shaw, A. H. White, and F. G. Goodridge, had made splendid collections of fossils during their stay of but a few hours at Silliman's Fossil Mount, which is at the head of Frobisher Bay.

These fossils are well preserved, and here, as is so often the case in Paleozoic faunas, the brachiopod specimens predominate. However, unlike other Trenton faunas, the Arctic mollusca usually preserve the shell, and this is the more remarkable because all the fossils weather out of a bluish clay. The author's interest in and admiration for these well-preserved fossil forms from a rarely visited region was so great that he could not resist asking the loan of the various collections for the purpose of making them known to paleontologists. Mr. J. N. Carpender, of New Brunswick, New Jersey, who had the most extensive collection, with great liberality allowed the author to make a selection from these fossils for the U. S. National Museum. From him, therefore, this Museum has received 54 species represented by 113 specimens. The next largest lots were gathered by Messrs. A. H. White and A. V. Shaw, and purchased for the Museum. Mr. F. G. Goodridge presented one of the finest trilobites found. Mr. R. W. Porter also made a good collection, which he deposited in the American Museum

of Natural History, and these specimens were kindly placed at the author's disposal for study, by Prof. R. P. Whitfield. To these gentlemen, therefore, paleontology is indebted for rendering it possible to describe one of the best collections of fossils made in Arctic regions.

With the aid of a camera lucida, Mr. E. O. Ulrich, of Newport, Kentucky, made the figures, which are accurate representations of the species. The author is further indebted to him for paleontological assistance, and his various notes are incorporated in this paper in their proper places.

DESCRIPTION OF LOCALITIES.

Frobisher Bay.—Previous to 1897, all that was known of the geology of Frobisher Bay was included in a few incidental notes by Charles Francis Hall.[1] His collections were partly studied by Mr. R. P. Stevens[2] and Prof. B. K. Emerson.[3]

During the months of August and September, 1861, Hall, in company with Innuit men, women, and children, explored, by means of whale boats, the greater part of Frobisher Bay, which up to that time was believed by civilized man to be a strait. On this trip he was also greatly rejoiced to find unmistakable evidence of Frobisher's visit of 1556–57. The book cited is interesting reading, and from it are taken the following notes regarding the geology of this Bay.

Jones Cape.—Hall "ascended a mountain in the rear of our encampment. * * * On my way I observed a considerable quantity of the stone I had noticed upon Iron Island, and I also saw many small pieces of limestone on the very summit about a thousand feet above the level of the sea."[4]

This may be the locality which furnished the fossils from the Utica stage, described by Professor Emerson and listed beyond.

Cape Stevens.—This locality is nearly 100 miles farther inland than Cape Jones, and here Hall on the top of a mountain "found numerous shells and fossils, some of which [he] brought away."[5]

This may be the locality furnishing the Trenton fossils described by Professor Emerson and listed beyond.

Silliman's Fossil Mount.—At this place fossils were first brought to Hall by the natives.

> At my left, across the river, was a ridge of white, which I afterward named Silliman's Fossil Mount (thus named after Benjamin Silliman, jr., of New Haven, Connecticut. This fossil mount is on the west side of the termination of Frobisher Bay. It is in latitude 63° 44′, longitude 68° 56′), and behind it the unbroken front of a line

[1] Arctic Researches and Life Among the Esquimaux, New York, 1865.

[2] Amer. Journ. Sci., 2d ser., XXXV, 1863, p. 404.

[3] Narrative of the Second Arctic Expedition made by Charles F. Hall, edited by J. E. Nourse, Washington, 1879. Appendix III, On the Geology of Frobisher Bay, and Field Bay, by B. K. Emerson.

[4] Ibidem, p. 373.

[5] Ibidem, p. 381.

of mountains extending northwesterly to the opening which I have called the Great Gateway.[1] * * *

I visited that phenomenon; I mounted it, and went around it also. It is a mount of marine fossils in limestone, half a mile long, and over a hundred feet high [340 feet aneroid, according to Porter]. * * * The débris of the fossils begins at or near the top of the mount, falling at such an angle as broken stone from a mountain always make, an inclination of about 40°. Above the talus, or heap of broken stones, is a mass of fossils in limestone, strata-like. A smaller mount of the same character is close by, but all in débris. It seems to have been divided from the main mount by the rushing down of waters from the mountains behind. A small stream comes down the mountains, passes along, and finally makes its way out between the two fossil mounts. This is also indicated in the course of this stream, as an acre or more of the plain is covered several feet in depth with the washed-down débris of fossils. * * * The top of Silliman's Fossil Mount is covered with boulders and grass. Even when close to the small mount it looks like sand, but on examination it is fine broken limestone and fossils.[2]

FIG. 1.—A DISTANT VIEW OF SILLIMAN'S FOSSIL MOUNT. (Photograph by R. W. Porter.)

Mr. R. W. Porter, who visited Silliman's Fossil Mount in August, 1897, described it to the writer as follows:

ON BOARD S. S. HOPE,
September 18, 1897.

CHARLES SCHUCHERT, Esq.

MY DEAR SIR: In accordance with your request, I take pleasure in handing to you the following notes on Silliman's Fossil Mount (Hall's) of Frobisher Bay, Baffin Land. They are very meager—the results of only a few hours' visit to this formation, as I had intended to give the place a more thorough search next year.

Silliman's Fossil Mount lies at the head of Frobisher Bay, some 3 miles south of the Jordan River and about 1 mile from tide water. It lies close against the mountains of Meta Incognita [apparently unconformably], is about 1,000 yards long and 340 feet high (aneroid; not 100 feet, as given by Hall), general direction northwest and southeast. The fossils were taken from the talus slopes, the bed of the brook flowing at the base of the mount, in the limestone near the summit, and on the top itself.

At its northern end there is a smaller mount of lesser height. The mount forms a striking feature of the landscape, and is composed of limestone, disintegrated to such an extent that the talus reaches nearly to the summit, which is very flat and composed of the ledge itself. This limestone ledge of nearly horizontal beds out-

[1] Narrative of the Second Arctic Expedition made by Charles F. Hall, edited by J. E. Nourse, Washington, 1879. Appendix III, On the Geology of Frobisher Bay, and Field Bay, by B. K. Emerson, p. 405.

[2] Ibidem, pp. 410-411.

crops all around the summit with vertical sides 10 to 20 feet high. The summit or table top is covered with moss and grass and several large bowlders of glacial origin. At its southeastern extremity it is joined to the range of mountains running parallel to the mount and rising to altitudes of from 500 to 800 feet. Between the mount and neighboring mountain side flows a good-sized brook, flowing northwardly and out into the valley between the greater and lesser mounts.

FIG. 2.—A NEAR VIEW OF SILLIMAN'S FOSSIL MOUNT. (Photograph by R. W. Porter.)

This brook has probably caused the separation of these two elevations, and has carried a quantity of clay and limestone out into the valley for several hundred yards.

A close scrutiny of the adjacent mountain range revealed no limestone formation on its side. The rock of this range is a dark mica-schist, the dips making an angle of about 30° with the horizon. Its surface in many places shows the marks of glaciation (one moraine lying against the northern side of the smaller mount), but for the most part the parent ledge is hidden under a quantity of its own rock broken up by frost action.

I found a great number of limestone bowlders, erratics, scattered through the valley of the Jordan River and on the sides and summits of the mountains which border it.

Finally, it may be interesting to know that the natives told me that these same formations containing fossils existed in several localities in the lake region of the interior.

Very truly, yours,

RUSSELL W. PORTER.

Region west and northwest of Frobisher Bay.—From Mr. Porter's account of Silliman's Fossil Mount, it is evident that similar Lower Silurian strata occur in the lake region of the interior of Baffin Land.

Mr. E. M. Kindle[1] reports that Missionary Peck obtained from Lake Kennedy, which lies northwest of the head of Cumberland Sound, the following drift fossils:

Zaphrentis sp.? [probably *Streptelasma corniculum*].
Halysites catenulatus [probably var. *gracilis* Hall].
Maclurea magna? [probably *Maclurina manitobensis*].
Endoceras proteiforme.

With the fauna of Silliman's Fossil Mount as a guide, it is probable that no horizon other than the Trenton is indicated by the species cited.

Dr. Robert Bell[2] reports that—

On ice pans farther up the coast [from Big Island in Hudson Strait], or to the

[1] Amer. Journ. Sci., 4th ser., II, 1896, p. 456.

[2] Observations on the Geology, etc., of Hudson Strait and Bay, made in 1885. Ann. Rept. Geol. and Nat. Hist. Survey of Canada, new ser., I, 1885, pp. DD. For a summary of North American Arctic geology see the report of the same Survey for 1886, II, 1887, p. R.

northwestward, I found fragments of shaly marl and of gray limestone with fossils, among which *Receptaculites Owcni* was easily distinguished. Shells and bryozoa, belonging to moderately deep-water species, were found on the same pans. The limestone fragments, just mentioned, would point to the occurrence of Silurian rocks on or near the great bays in the western part of the north shore of the straits, where the land is said to be low [see also the description of Akpatok Island]. Dr. Franz Boas of Berlin [now of New York] has recorded the existence of these rocks in the interior of Baffin Land, about 2 degrees of latitude north of this region. He says:[1] "Through the occurrence of the Silurian rocks in the Nettilling (Lake) (=Lake Kennedy), the discovery of the same formation at the upper end of Frobisher Bay increases in value. We must now suppose that the Silurian limestones, which appear at Prince Ruperts Inlet, extend from there to Frobisher Bay, and overlie the granites and gneisses of Baffins Bay and Davis Strait. We will not be far astray if we connect this extensive Silurian district with the limestones which occur to the south of Igluling, and which form the flat eastern half of Melville Peninsula. Southward from Nettilling, these rocks rise in low hill ranges."

Farther to the north, great areas of Upper Silurian rocks occur, yielding characteristic fossils of this age. In association with this fauna also occur species of Lower Silurian age. Two of these are *Receptaculites arcticus* Etheridge, and *R. occidentalis* Salter. The latter may be the same as *R. owcni* of this paper, a species closely related to *R. occidentalis*. One or both of these species are found associated with a typical Upper Silurian fauna at Cape Louis Napoleon (latitude 79° 38′ north), and Cape Frazer (latitude 79° 45′ north). *Maclurea arctica* Haughton, *M. logani* Salter, and *M. magna* Lesueur, are also identified as occurring in this region in Upper Silurian faunas. Such localities are Fury Point (latitude 72° 50′ north, longitude 92° west), Depot Bay (latitude 72° north, longitude 94° west), Cape Hilgard (latitude 79° 41′ north), and Bessels Bay (latitude 81° 6′). *Maclurea arctica* with *Actinoceras crebriseptum* Hall and *Receptaculites neptuni* Defrance (probably = *R. owcni*) are found with Upper Silurian fossils on the west coast of King Williams Island. *Maclurea*, or *Maclurina*, is a genus restricted to the Lower Silurian, and the same is true of *Actinoceras crebriseptum*. On the other hand, Etheridge has described as *Helicotoma naresii*, a similar shell from the Upper Silurian of Offley Island (latitude 81° 16′ north) and with this the author has identified a specimen in the U. S. National Museum collected by Dr. E. Bessels at Polaris Bay (latitude 81° 38′ north). The preservation of these shells, however, is such that any identification will have little value.

The foregoing facts can be interpreted in various ways:

First, Arctic collections of fossils are usually made by explorers who pick up loose fossils, some of which may have been carried by the ice considerable distances. In this way, specimens from several horizons become mixed. The author, however, does not believe that this is generally the case here, since the apparant mixtures occur in seven localities distributed between latitudes 72° to 81° 6′ north.

Secondly, the identifications are not uniform, and this is particularly true of the specimens of *Maclurea*. For the present, therefore, it will

[1] Petermann's Mittheilungen, November, 1885.

be necessary to eliminate such identifications as horizon markers from the Upper Silurian local faunæ.

Thirdly, *Receptaculites arcticus*,[1] *R. occidentalis*, and *R. oweni* are good Lower Silurian horizon markers and are easily identified. Therefore the writer accepts the presence of these forms as indicative of Lower Silurian rocks. Such localities are Cape Louis Napoleon, Cape Frazer, and the west coast of King Williams Island.

From this evidence, it appears that to the north of Baffin Land other areas of Trenton strata occur, and likewise that at Cape Louis Napoleon, Cape Frazer, and on the west coast of King Williams Island, they underlie the Upper Silurian beds. Probably, it is this occurrence rather than the transportation by ice, which has led to the mixing of the faunas.

Akpatok Island.—The Trenton of Frobisher Bay and Lake Kennedy apparently continues southward to Hudson Strait, where, in the vicinity of Big Island, *Receptaculites oweni* was found by Dr. Bell on pan ice, as described above. Another Trenton limestone area occurs more to the east, and near the south shore of Hudson Strait, on Akpatok Island, in Ungava Bay. Here Dr. Bell[2] obtained 90 fossils of Trenton age. He writes:

> The portion of the island which I saw [northern end to middle of east side] consists of unaltered gray limestone in horizontal beds, and it presents a perpendicular wall 400 to 500 feet high all along. This sea wall is clear cut and the beds appear thick and solid, but wherever their edges have been long exposed to the weather or in the hillsides and ravines of the interior, they split up into thinner layers. Some fragments observed in one place had the appearance of lithographic stone. * * * This formation must here have a thickness of 900 feet above sea level, and there is possibly a great additional thickness of Cambro-Silurian rocks beneath the sea level.

EXTENT OF THE ARCTIC TRENTON.

From the foregoing description of localities, it appears that Middle Lower Silurian horizons are very extensive in eastern Arctic America. Such are known in places on either side of Hudson Strait, Frobisher Bay, the interior of Baffin Land, and to the north of this land at various localities between latitudes 79° and 80° north. As far as known, these strata unconformably overlie very ancient crystalline rocks and are in turn overlain by Upper Silurian beds of Niagara or Wenlock age. Lower Cambrian rocks are found in southern Labrador, but in the region of Baffin Land such are not known to be present. Here, then, there seems to be a complete break from the Laurentian to the Trenton, followed by another break paleontogically, in the absence of the Cincinnatian beds, and probably the lower horizons of the Upper Silurian. The Lower Silurian fossils of this area indicate nothing older than the typical Trenton of New York and the Galena of Wisconsin and

[1] The types of this species are in the British Museum, and Dr. Hinde in his work on the Receptaculitidæ (Quart. Jour. Geol. Soc., London, November, 1884, p. 845) gives the horizon as Lower Silurian.

[2] Summary Rept. of Geol. Surv. Dept. for the year 1897-98, pp. 82, 83.

Minnesota, and nothing younger than the Utica stage of the United States. The thickness of these beds is not less than 900 feet and probably exceeds this.

This summary is based on information known to the author, and, while the evidence is meager, the essential geological age and the sequence of the rocks of Baffin Land seem to be established.

PALEONTOLOGY.

Hall's collections.—The few fossils collected at Silliman's Fossil Mount and brought to America by Mr. Hall were identified by R. P. Stevens[1] for the New York Lyceum of Natural History, as follows:

Maclurea magna Lesueur [probably *Maclurina manitobensis*].
Endoceras proteiforme Hall? [=*Cameroceras proteiforme*].
Orthoceras (badly worn specimens).
Heliolites (new species).
Heliolites (new species).
Halysites catenulata.
Receptaculites (new species) [=?*R. oweni* of this paper].

There is apparently nothing in this list but what was again discovered in 1897. Mr. Stevens writes that "the fossils, without doubt, are all Lower Silurian," and on the basis of the *Maclurea magna* "would place the limestone containing it on the horizon of the Chazy limestone of New York." However, it does not appear that this writer announced any particular age beyond Lower Silurian for the rocks comprised in Silliman's Fossil Mount.[2]

Another lot of fossils collected by Hall on his first expedition to Frobisher Bay was given to Amherst College, and forms the basis of Prof. B. K. Emerson's report "On the Geology of Frobisher Bay and Field Bay." In this lot, there is apparently nothing from Silliman's Fossil Mount, but Utica and Trenton fossils are present from localities more to the eastward and from the north shore of Frobisher Bay. These are:

TRENTON SPECIES.	UTICA SPECIES.
["Gray argillaceous limestone." ?Cape Stevens.]	["Flinty bituminous limestone." ?Jones Cape.]
Buthotrephis cfr. gracilis Hall.	*Diplograptus dentatus*(Brongniart).
Stictopora ramosa Hall?	*Lingula curta* Conrad.
Rhynchonella.	*Endoceras proteiforme* Hall.
Tellinomya levata Hall.	*Orthoceras laqueatum* Hall?
Murchisonia gracilis?	*Triarthrus becki* Green.
Conularia trentonensis Hall.	*Calymmene senaria* Conrad.

[1] Amer. Journ. Sci., 2d ser., XXXV, 1863, pp. 293, 294.

[2] Prof. B. K. Emerson says: "We made inquiry, but can find no traces of this or the other fossils reported upon in Mr. Stevens's article quoted." See "On the Geology of Frobisher Bay and Field Bay." Appendix III to "Narrative of the Second Arctic Expedition made by Charles F. Hall," edited by Prof. J. E. Nourse, Washington, 1879, p. 576.

TRENTON SPECIES—continued.

["Gray argillaceous limestone." ?Cape Stevens.]

Tentaculites.
Leperditia alta Conrad.
Leperditia canadensis Jones.
Primitia muta Jones.
Primitia frobisheri Emerson.
Beyrichia symmetricus Emerson.
Asaphus sp.

UTICA SPECIES—continued.

["Flinty bituminous limestone." ?Jones Cape.]

Cyphaspis frobisheri Emerson.

The Trenton horizon may be the same as that of Silliman's Fossil Mount. In any event, the foregoing lists indicate horizons intimately connected, and it is probable that all the fossiliferous strata at the head of Frobisher Bay are of Trenton and Utica age.

Akpatok Island.—The fossils collected by Dr. Bell on Akpatok Island have been studied by Professor Whiteaves,[1] with the following results:

The species indicate the Trenton limestone, and "are remarkably similar to the fossils of the Trenton formation of the Red River Valley in Manitoba." "Eleven had previously been found in the Manitoba Trenton, and nine are species that are common at East Selkirk and Lower Fort Garry." This fauna also connects directly with that of Silliman's Fossil Mount.

The following is a list of the species:

Receptaculites oweni Hall.
Streptelasma robustum Whiteaves.
Calapœcia canadensis Billings.
Rafinesquina lata Whiteaves.
Leptæna unicostata (Meek and Worthen).
Plectambonites sericea (Sowerby).
Orthis tricenaria Conrad.
Orthis (*Dinorthis*) *meedsi arctica* Schuchert.
Orthis (*Hebertella*) *bellirugosa* (Conrad).
Orthis (*Dalmanella*) *testudinaria* (Dalman).
Platystrophia biforata (Schlotheim).
?Rhynchotrema inæquivalvis (Castelnau).
Cyrtoceras manitobense Whiteaves.

[1] Amer. Journ. Sci., 4th ser., VII, 1899, pp. 433, 434.

List of fossils from Silliman's Fossil Mount and their distribution.

Species.	Horizons.				Regions.	
	Birdseye or Lowville.	Black River.	Trenton or Galena.	Cincinnatian.	Minnesota, Manitoba.	New York, Ottawa.
Receptaculites oweni Hall	.....	.....	×	.....	×	.....
Ischadites iowaensis (Owen)	.....	.....	×	.....	×	.....
Halysites catenulatus gracilis (Hall)	.....	.....	×	.....	×	.....
Lyellia affinis (Billings)	.....	.....	.....	×	.....	.....
Plasmopora lambi, new species	.....	.....	.....	.....	.....	.....
Calapœcia canadensis Billings	×	×	.....	×	×	×
Streptelasma corniculum Hall	.....	.....	×	.....	×	×
Porocrinus shawi, new species	.....	.....	.....	.....	.....	.....
Lichenocrinus affinis Miller	.....	.....	.....	×	.....	.....
Crepipora, species undetermined	.....	.....	.....	.....	.....	.....
Orthis tricenaria Conrad	×	×	×	.....	×	×
Orthis (*Dalmanella*) *testudinaria* (Dalman)	×	×	×	×	×	×
Orthis (*Plectorthis*) *plicatella* Hall	.....	.....	×	×	×	.....
Orthis (*Hebertella*) *borealis* (Billings)	.....	.....	×	.....	×	×
Orthis (*Hebertella*) *bellirugosa* (Conrad)	×	×	×	.....	×	.....
Orthis (*Dinorthis*) *meedsi* Winchell and Schuchert	.....	.....	×	.....	×	.....
Orthis (*Dinorthis*) *meedsi arctica*, new variety	.....	.....	.....	.....	.....	.....
Platystrophia biforata (Schlotheim)	×	×	×	×	×	×
Parastrophia hemiplicata Hall	.....	.....	×	.....	×	×
Rhynchotrema inaequivalvis (Castelnau)	.....	.....	×	.....	×	×
Ctenocoma subnasuta Ulrich ?	.....	.....	×	.....	×	.....
Ctenodonta frobisherensis, new species	.....	.....	.....	.....	.....	.....
Ctenodonta carpenderi, new species	.....	.....	.....	.....	.....	.....
Ctenodonta baffinensis, new species	.....	.....	.....	.....	.....	.....
Modiolodon arctica, new species	.....	.....	.....	.....	.....	.....
Whitaevesia symmetricus, new species	.....	.....	.....	.....	.....	.....
Cyrtodonta sillimanensis, new species	.....	.....	.....	.....	.....	.....
Cyrtodonta gibbera, Ulrich variety	.....	.....	.....	.....	.....	.....
Vanuxemia abrupta Ulrich	.....	.....	×	.....	×	.....
Vanuxemia baffinensis, new species	.....	.....	.....	.....	.....	.....
Whitella arcticus, new species	.....	.....	.....	.....	.....	.....
Saffordia modesta Ulrich	.....	.....	×	.....	×	.....
Protowarthia pervolutus Ulrich and Scofield	.....	×	×	.....	×	.....
Tetranota obsoleta Ulrich and Scofield	×	×	×	×	×	×
Kokenia costalis Ulrich and Scofield	.....	.....	×	.....	×	.....
Bellerophon similis Ulrich and Scofield	.....	.....	×	.....	×	.....
Lophospira spironema Ulrich and Scofield	.....	×	.....	.....	×	.....
Liospira americana (Billings)	×	×	×	.....	×	×
Clathrospira conica Ulrich and Scofield	.....	×	×	×	×	×
Seelya (*?*) *ulrichi*, new species	.....	.....	.....	.....	.....	.....
Helicotoma (*?*) *larvata* Salter	.....	×	.....	.....	.....	×
Maclurina manitobensis (Whiteaves)	.....	.....	×	.....	×	.....
Maclurina cuneata (Whitfield)	.....	.....	×	.....	×	.....
Maclurea crassa Ulrich and Scofield	.....	.....	×	.....	×	.....
Trochonema umbilicatum (Hall)	×	×	×	?	×	×
Trochonema (*Eunema*) *robbinsi* Ulrich and Scofield	.....	.....	×	.....	×	.....
Holopea arctica, new species	.....	.....	.....	.....	.....	.....
Trochus (*?*), species undetermined	.....	.....	.....	.....	.....	.....
Fusispira inflata (Meek and Worthen)	.....	.....	×	.....	×	.....
Fusispira nobilis Ulrich and Schofield	.....	.....	×	.....	×	.....
Cameroceras proteiforme (Hall)	×	×	×	.....	×	×
Orthoceras olorus baffinensis, new variety	.....	.....	.....	.....	.....	.....
Orthoceras bilineatum Hall	.....	×	×	.....	×	.....
Orthoceras porteri, new species	.....	.....	.....	.....	.....	.....
Orthoceras scalariformis, new species	.....	.....	.....	.....	.....	.....
Cyrtoceras manitobense Whiteaves	.....	.....	×	.....	×	.....
Cyrtoceras cornulum, new species	.....	.....	.....	.....	.....	.....
Cyrtoceras baffinensis, new species	.....	.....	.....	.....	.....	.....
Clinoceras exiguum (Billings)	.....	.....	×	.....	×	×
Oncoceras arcticum, new species	.....	.....	.....	.....	.....	.....
Poterioceras, species undetermined	.....	.....	.....	.....	.....	.....
Eurystomites plicatus Whiteaves	.....	.....	×	.....	×	.....
Bythocypris granti Ulrich	.....	×	.....	.....	×	.....
Primitia or *Klædenia*	.....	.....	.....	.....	.....	.....
Krausella, 2 new species	.....	.....	.....	.....	.....	.....
Nileus vigilans (Meek and Worthen)	.....	×	×	×	×	.....
Illænus crassicauda americanus (Billings)	.....	.....	×	.....	×	.....
Isotelus gigas De Kay	.....	.....	×	×	×	×
Dalmanites (*Pterygometopus*) *goodrigi*, new species	.....	.....	.....	.....	.....	.....
Ceraurus pleurexanthemus Green	×	×	×	×	×	×
Total	10	17	38	11	41	17

Age of Silliman's Fossil Mount.—From Mr. Porter's description, it will be seen that the fossils recently collected at Silliman's Fossil Mount are from various horizons, and yet there is nothing to indicate the presence of more than one fauna. The foregoing list shows that at present there are 72 species known from this locality, and of these 28 are restricted to it. There are, therefore, 54 species which are common to other localities, a goodly number with which to make safe correlations. Of these 54 species, 41, or 57 per cent of the known fauna, are also found in the region of Minnesota, Wisconsin, and Iowa, while 17 are known to occur in New York and Ottawa.

On comparing the 54 widely distributed species with those from definite stages in Minnesota, it is seen that 10 are also found in Birdseye (= Lowville), 17 in the Black River, 38, or about 70 per cent, in the Galena, the direct equivalent of the New York Trenton, and 11 in the Cincinnatian group.

From these figures it is evident that the stage of Silliman's Fossil Mount belongs in the Galena, and that the fauna is more intimately related to that of the Minnesota region than to the Trenton of New York. When the New York Trenton fauna is restudied in the light of recent researches in Minnesota,[1] however, it will be shown that the two faunas have more in common than now appears. On the other hand, the lithological similarities of the Minnesota Galena and Silliman's Fossil Mount—light-colored shales predominating in both areas—may explain in large measure the close identity of these widely separated faunas.

This little fauna likewise brings out the fact that the corals, brachiopods, gastropods, and the trilobites are slow in their evolutional change, and the species can therefore spread over very great areas, while the cephalopods, and particularly the pelecypods, are more sensitive to change, and are thus restricted to localities.

DESCRIPTION OF SPECIES.

Uncertain Class.

Family RECEPTACULITIDÆ Roemer.

RECEPTACULITES OWENI Hall.

Receptaculites oweni HALL, Geol. Rept. Wis., 1862, p. 46, fig. 2; p. 429.—WINCHELL and SCHUCHERT, Geol. Minn., III, Pt. 1, 1893, p. 57, pl. F, figs. 1-4.

In the present collection, this species is represented by a large disk-shaped specimen which measures 6 inches from the central apex to the

[1] See the two magnificent volumes on the paleontology of the Lower Silurian fossils of Minnesota, entitled Geology of Minnesota, III, Pts. 1, 2, published by the Geological and Natural History Survey of Minnesota, N. H. Winchell, State Geologist.

circumference, making the species originally not less than 12 inches over all. This is about the usual size for the larger specimens of *R. oweni* in Minnesota, although examples have been seen 20 inches in diameter.

Etheridge has described *R. arcticus* from Cape Frazer and Cape Louis Napoleon in Grinnell Land. This is also a large disk-shaped species, similar in growth to *R. oweni*, but the walls are usually twice as thick, and the transverse tubes are much larger and fewer in a given space than in the species last named.

Collectors.—J. N. Carpender, A. H. White, and A. V. Shaw. Cat. No. 28143, U.S.N.M.

ISCHADITES IOWAENSIS (Owen).

Selenoides iowensis OWEN, Geol. Surv. Wis., Iowa, Minn., 1852, p. 587, pl. 2B, fig. 13.
Ischadites iowensis WINCHELL and SCHUCHERT, Geol. Minn., III, Pt. 1, 1893, p. 64, pl. F, figs. 5, 6.

A well-preserved fragment of this species is identical with specimens from Goodhue County, Minnesota.

Collector.—J. N. Carpender. Cat. No. 28144, U.S.N.M.

Class CŒLENTERATA.

Order ALCYONARIA Edwards and Haime.

Family HALYSITIDÆ.

HALYSITES CATENULATUS, var. GRACILIS Hall.

Halysites catenularia var. *gracilis* LAMBE, Geol. Surv. Canada, Cont. to Canadian Pal., V, 1899, p. 69, pl. III, figs. 5–7.

Of this widely distributed species, which begins in the Trenton and dies out in the Lower Helderberg, there are several excellent specimens present. These Arctic Trenton specimens are in harmony with the variety *gracilis*, which is restricted to the Trenton and Lorraine stages.

Collectors.—J. N. Carpender, A. H. White, and A. V. Shaw. Cat. No. 28138, U.S.N.M.

Family HELIOPORIDÆ Moseley.

LYELLIA AFFINIS (Billings).

For synonymy see Lambe, Geol. Surv. Canada, Cont. to Canadian Pal., IV, 1899, p. 84.

This species, of which there are in the present collection three well-preserved examples, Mr. Lambe says occurs in the "Hudson River and Niagara formations, in the four divisions of the Anticosti group, and in the Lower Helderberg group." To this range is now added the Trenton stage.

Collectors.—J. N. Carpender and A. V. Shaw. Cat. No. 28139, U.S.N.M.

PLASMOPORA LAMBII, new species.

This species begins growth on some small foreign object, and expands to a diameter exceeding 12 cm. by 7 cm. in height. Beyond the place of attachment the lower surface is irregularly concave and covered by a thin epitheca. The upper surface is in form depressed hemispheric to conical. Corallites from 1 to 1.75 mm. in diameter, commonly about 1.25 mm., circular, and separated from one another from 0.5 to 1.25 mm. Septa not prominent, and where the original surface is well preserved not easily distinguishable from the radial striations, or granular surface, of the tubular area. Corallites with very closely adjoining tabulæ, which are generally decidedly vesicular, but in places they are flat. In longitudinal sections there are from two to five tubules between neighboring corallites; the tabulæ are convex, generally giving the inter-corallite space a decided vesicular structure.

The general vesicular condition of the tabulæ in both the tubules and corallites distinguishes *P. lambii*. This feature was pointed out by Mr. Lawrence M. Lambe of the Canadian Geological Survey, and the writer takes pleasure in connecting his name with this new species in appreciation of his excellent work on the corals of Canada.

Collectors.—J. N. Carpender, A. H. White, and A. V. Shaw. Cat. No. 28140, U.S.N.M.

CALAPŒCIA CANADENSIS Billings.

For synonymy see Lambe, Geol. Surv. Canada, Cont. to Canadian Pal., IV, 1899, p. 43.

Of this species, there is a small, depressed, hemispheric specimen in which the corallites are in contact, and therefore there is little interzooecial vesicular tissue. The hexagonal, nearly uniform corallites are from 3 to 4 mm. in width, and each has from 18 to 20 septa.

The above identification is confirmed by Mr. Lawrence M. Lambe.

Collector.—J. N. Carpender. Cat. No. 28142, U.S.N.M.

Order MADREPORARIA Edwards and Haime

Suborder TETRACORALLA Haeckel.

Family STREPTELASMIDÆ Nicholson.

STREPTELASMA CORNICULUM Hall.

Streptelasma corniculum HALL, Pal. N. Y., I, 1847, p. 69, pl. XXV, figs. 1*a*–1*e*.—WINCHELL and SCHUCHERT, Geol. Minn., III, Pt. 1, 1893, p. 90, pl. G, figs. 20, 21.

This characteristic Trenton cup coral is common in the strata of Silliman's Fossil Mount, and agrees well with specimens from the Galena horizon of Minnesota.

Collectors.—J. N. Carpender, A. V. Shaw, and A. H. White. Cat. No. 28141, U.S.N.M. The American Museum of Natural History has a number of specimens collected by Mr. R. W. Porter.

CYSTOIDEA.

Family CRYPTOCRINIDÆ Zittel.

POROCRINUS SHAWI, new species.

(Plate XII, figs. 1–3.)

This species is most nearly related to *P. smithi* Grant,[1] as far as the shape of the dorsal cup, elevation of the costæ, and form of the plates are concerned. It differs, however, from all American species in that the circular pore-rhomb spaces are larger. This is particularly true of the lowest series, which occupy nearly the entire basal plates besides portions of two adjoining subradials. The rhombs are also very large in the interradial areas on each side of the arm bases.

The ambulacral grooves are narrow and short, and within the shallow vestibule terminate abruptly below into the body cavity. The margin bordering the large, central, circular opening is somewhat notched at each ambulacral groove, giving the impression that there may have been communication between the oral opening and each ambulacral groove. The smaller ventral plates are not preserved in this specimen, which is the only one known.

Named for Mr. A. V. Shaw, of Boston, Massachusetts, who was one of the Frobisher Bay party of 1897.

Collector.—A. H. White. Cat. No. 28145, U.S.N.M.

Family LICHENOCRINIDÆ.

LICHENOCRINUS AFFINIS Miller.

Lichenocrinus affinis MILLER, Journ. Cinn. Soc. Nat. Hist., V, 1882, p. 229, pl. IX, figs. 7, 7*a*.

But a single specimen of this species has been noted, and this was attached to an Orthoceras. It has the general aspects of *L. affinis* in the pentagonal column, form of body, slight convexity, number of plates, and the general irregularity of these, both in form and arrangement.

The genus *Lichenocrinus* has not been previously recorded from rocks below the Utica. In the Cincinnatian group specimens are often abundant where *L. affinis* occurs in the upper third or Richmond stage.

Collector.—J. N. Carpender. Cat. No. 28146, U.S.N.M.

[1] Ottawa Field Nat. Club, Trans. No. 2, 1881, p. 42, plate, figs. 1–8.

BRYOZOA.

Family CERAMOPORIIDÆ Ulrich.

CREPIPORA, species undetermined.

Specimens of this species were sent to Mr. E. O. Ulrich, who identified them as belonging to *Crepipora*. The minute structure, however, is poorly preserved, and no thin sections were made.

Collectors.—A. H. White, J. N. Carpender, and A. V. Shaw. Cat. No. 28147, U.S.N.M.

Class BRACHIOPODA.

Order PROTREMATA Beecher.

Family ORTHIDÆ Woodward.

ORTHIS TRICENARIA Conrad.

Orthis tricenaria CONRAD, Proc. Acad. Nat. Sci. Phila., 1843, p. 333.—WINCHELL and SCHUCHERT, Geol. Minn., III, Pt. 1, 1893, p. 418, pl. XXXII, fig. 18-23.

This well-known and characteristic Trenton species is represented by two specimens, which are small for this form, but otherwise closely resemble those from the Galena shale of Minnesota. On Akpatok Island the species attained the largest growth known, being more than three times as large as those found in Baffin Land.

Collector.—J. N. Carpender. Cat. No. 28149, U.S.N.M. One specimen was also found by Mr. R. W. Porter and is now in the American Museum of Natural History.

ORTHIS (DALMANELLA) TESTUDINARIA (Dalman).

Orthis (*Dalmanella*) *testudinaria* WINCHELL and SCHUCHERT, Geol. Minn., III, Pt. 2, 1893, p. 441, pl. XXXIII, figs. 17-22.

This ubiquitous Lower Silurian species is very abundant at Silliman's Fossil Mount, and at this locality is quite constant in its characters. The specimens belong to the variety with fine striæ, in which the dorsal valve is often slightly convex, recalling the subgenus *Rhipidomella* rather than *Dalmanella*. However, other examples have the typical flat dorsal valve, with a well-defined median sinus.

Collectors.—J. N. Carpender, A. H. White, and A. V. Shaw. Cat. No. 28148, U.S.N.M. The American Museum of Natural History also has a number of specimens collected by Mr. R. W. Porter.

ORTHIS (PLECTORTHIS) PLICATELLA Hall.

Orthis (*Plectorthis*) *plicatella* WINCHELL and SCHUCHERT, Geol. Minn., III, Pt. 1, 1893, p. 436, pl. XXXIII, figs. 5-7.

As a rule, this species is not abundant in the Trenton either in New York or in Minnesota, but at Silliman's Fossil Mount it is a common shell.

The Arctic examples are large and robust, and agree rather with specimens from Watertown, New York, than with those from Minnesota, which are somewhat smaller. The species is often confounded with *Orthis* (*Hebertella*) *borealis*, but can be easily distinguished by the almost entire absence of fold and sinus. When these are present, however, they are found to occupy a position the reverse of that seen in the latter species.

Collectors.—J. N. Carpender, A. V. Shaw, and A. H. White. Cat. No. 28150, U.S.N.M. A number of specimens collected by Mr. R. W. Porter are in the American Museum of Natural History.

ORTHIS (HEBERTELLA) BOREALIS (Billings).

Orthis (*Hebertella*) *borealis* WINCHELL and SCHUCHERT, Geol. Minn., III, Pt. 1, 1893, p. 433, figs. 33*a*-33*c*.

This well-developed species is represented by six typical specimens. They much resemble *O.* (*P.*) *plicatella* externally except in the position of the fold and sinus, which is the reverse of that seen in Hall's species.

Collector.—J. N. Carpender. In the American Museum of Natural History there are three specimens collected by R. W. Porter. Cat. No. 28151, U.S.N.M.

ORTHIS (HEBERTELLA?) BELLIRUGOSA (Conrad).

Orthis (*Hebertella?*) *bellarugosa* WINCHELL and SCHUCHERT, Geol. Minn., III, Pt. 1, 1893, p. 434, pl. XXXIII, figs. 1–4.

This species is never abundant in the Trenton, and the same is true in Baffin Land. Mr. Russell W. Porter found a single specimen, which is now in the American Museum of Natural History. This form also occurs on Akpatok Island, Ungava Bay, Labrador.

ORTHIS (DINORTHIS) MEEDSI Winchell and Schuchert, var. ARCTICA, new variety.

(Plate XII, figs. 7, 8.)

Orthis (*Dinorthis*) *meedsi* WINCHELL and SCHUCHERT, Geol. Minn., III, Pt. 1, 1893, p. 427, pl. XXII, figs. 39-45.

This species, which is common in the Galena or Trenton stage of Minnesota, is also abundant at the Frobisher Bay locality. As in Minnesota, it is here also a very variable species. However, among the Arctic specimens this variation tends toward the equalization and increase of the number of plications, while in Minnesota, bundling of the plications accompanied by the development of a conspicuous dorsal sinus, is the chief trend of variation. The specimens having the last-named characters were given the varietal name *germana*. On the same ground it may be advisable to name the Arctic variation—those with the more numerous and equal plications, and an obsolete or nearly obsolete dorsal-sinus variety—*arctica*.

O. (*D.*) *meedsi* of Silliman's Fossil Mount also recalls *O.* (*D.*) *proavita* and *O.* (*D.*) *subquadrata*, showing that the three probably belong to one stock.

Collectors.—J. N. Carpender and A. H. White. Cat. Nos. 28152,3, U.S.N.M. A number of specimens are in the American Museum of Natural History, which were collected by Mr. R. W. Porter.

PLATYSTROPHIA BIFORATA (Schlotheim).

Platystrophia biforata WINCHELL and SCHUCHERT, Geol. Minn., III, Pt. 1, 1893, p. 455, pl. XXXIII, figs. 51–54.

This ubiquitous Silurian species appears to be rare at the Frobisher Bay locality, since but three specimens are present. These are small, a condition in harmony with their Trenton age, and have short hinge lines devoid of hinge extensions. The latter feature is best developed in the upper or Richmond stage of the Cincinnatian group.

Collectors.—J. N. Carpender and A. H. White. Cat. No. 28154, U.S.N.M. A single specimen is in the collection of the American Museum of Natural History.

Family PORAMBONITIDÆ Davidson.

PARASTROPHIA HEMIPLICATA Hall.

Parastrophia hemiplicata SCHUCHERT, Bull. U. S. Geol. Surv., No. 87, 1897, p. 300.

These small early pentameroids are under size in the Arctic locality, but otherwise are more in harmony with examples from New York than with those from Minnesota.

Collector.—A. H. White. Cat. No. 28156, U.S.N.M.

Order TELOTREMATA Beecher.

Family RHYNCHONELLIDÆ Gray.

RHYNCHOTREMA MINNESOTENSIS (Sardeson).

Rhynchotrema inaquiralvis WINCHELL and SCHUCHERT (part), Geol. Minn., III, Pt. 1, 1893, p. 459, pl. XXXIV, figs. 9–11, 15–23 (not figs. 12–14, 24, 25).

Rhynchonella minnesotensis SARDESON, Bull. Minn. Acad. Nat. Sci., III, 1892, p. 333, pl. IV, figs. 21–23; Amer. Geol., XVIII, 1896, p. 184.

The common *Rhynchonella* from the Birdseye or Lowville and Black River stages, which is usually identified as *R. increbescens* Hall, is always devoid of the concentric lamellæ so characteristic of *R. increbescens* = *R. inæquiralvis* of the Trenton stage. Occasional specimens occur with a few of the lamellæ near the anterior margin, but generally the shell is devoid of these, their places being occupied by very fine, wavy, concentric lines. In higher beds, these fine lines develop into stronger and more extended lamellæ, which find their greatest development in *Rhynchotrema perlamellosum* of the upper or Richmond stage of the Cincinnatian group.

The form of *R. minnesotensis* is quite variable and can not be of much aid in distinguishing this shell from *R. inæquivalvis*. The two are often found associated in the same beds, and it is then difficult to identify them correctly. This fact led Winchell and Schuchert, in 1893, to regard both as belonging to one species, *R. inæquivalvis*.

Locality and formation.—In the Lowville and particularly in the Black River stages of the Trenton in Minnesota and Wisconsin, Lexington, Kentucky, and in the Cincinnatian group at Savannah, Illinois. This species and *R. inæquivalvis subtrigonalis* are unknown at Silliman's Fossil Mount.

RHYNCHOTREMA INÆQUIVALVIS (Castelnau).

Spirifer inæquivalvis CASTELNAU, Essai Système Sil. l'Amérique Septentrionale, 1843, p. 40, pl. XIV, fig. 8.

Atrypa increbescens HALL, Pal. N. Y., I, 1847, p. 146, pl. XXXIII, figs. 13*a*–13*h* (probably not p. 289, pl. LXXIX, fig. 6).

Rhynchotrema inæquivalvis WINCHELL and SCHUCHERT (part), Geol. Minn., III, Pt. 1, 1893, p. 459, pl. XXXIV, figs. 12–14, 24, 25 (not figs. 9–11, 15–23=*R. minnesotensis*).

This species was first described by Castelnau, who obtained his specimens from the "magnesian limestone" of Drummonds Island. His figures show the characteristic concentric lamellæ which are almost always present on these shells coming from the Trenton, and this feature distinguishes them from those found in the Lowville and Black River stages. Hall subsequently described this shell as *Atrypa increbescens*, but it is now generally known as *Rhynchonella increbescens*. The species is a characteristic form of the Trenton, while in the Cincinnatian group its descendant *R. capax* attains large size, often great rotundity, with marked concentric lamellæ. The lamellar development finds its extreme in *R. perlamellosum*.

R. inæquivalvis is abundant at Silliman's Fossil Mount, the concentric lamellæ being also strongly developed in the specimens found.

Collectors.—J. N. Carpender, A. H. White, and A. V. Shaw. Cat. No. 28155, U.S.N.M. A number of specimens collected by Mr. R. W. Porter are in the American Museum of Natural History.

RHYNCHOTREMA INÆQUIVALVIS SUBTRIGONALIS (Hall).

Atrypa subtrigonalis HALL, Pal. N. Y., I, 1847, p. 145, pl. XXXIII, fig. 12.

This shell is only an elongate variety of *R. inæquivalvis* and appears to be a rare form in the Trenton of New York, yet at Curdsville, Kentucky, it is abundant. As in *R. inæquivalvis*, the lamellæ are well developed.

Class PELECYPODA.

Family NUCULIDÆ Gray.

CTENODONTA SUBNASUTA Ulrich?

(Plate XIII, figs. 4–6.)

Ctenodonta subnasuta ULRICH, Geol. Minn., III, Pt. 2, 1894, p. 585, pl. XLII, figs. 34–36.

There are two examples of this species, and these appear to agree best with Minnesota specimens of *C. subnasuta*. They were sent to Mr. E. O. Ulrich for direct comparison with his types. He writes:

You can not be far wrong if you identify these specimens with *C. subnasuta*. Still, there is some doubt as to their identity. The Arctic specimens are larger than the types, and relatively a little more elongate, while the basal outline is scarcely as convex, and the umbones not so full and evenly rounded. Finally, the smaller end, which I am now somewhat inclined to regard as the anterior, is relatively wider in your shells. I may add that the larger specimen indicates a thinner hinge plate than in the types, so that, after all, these specimens may belong to a distinct species. Typical *C. subnasuta* occur in the Trenton of Manitoba.

Collectors.—J. N. Carpender and A. H. White. Cat. No. 28163, U.S.N.M.

CTENODONTA CARPENDERI, new species.

(Plate XIII, figs. 1–3.)

This is the most abundant pelecypod from Silliman's Fossil Mount and appears to be closely related to *C. cuneiformis* Ulrich.[1] It differs, however, in various details, particularly in always being considerably larger. *C. carpenderi* has also the general aspect of small specimens of *C. nasuta*, but differs in the straight hinge line, especially that of the posterior end, which terminates abruptly into the regularly convex outline of this portion of the shell.

Mr. E. O. Ulrich, to whom several examples were sent, wrote as follows:

These specimens are closely related to *C. cuneiformis* Ulrich. The types of that species are much smaller, with the narrower end relatively shorter and the constriction more distinct. Good specific differences are found in the postcardinal region (i. e., assuming that the wider end is posterior). Here the Arctic species is more impressed, causing the umbonal ridge to be much more prominent, the postcardinal slopes wider and concave instead of flat. Just behind the beaks there is a triangular shaped area (ligamental probably) which is wanting in *C. cuneiformis*.

Named after Mr. J. N. Carpender, of New Brunswick, New Jersey, who made the most extensive collection of fossils at the head of Frobisher Bay.

Collectors.—J. N. Carpender, A. H. White, and A. V. Shaw. Cat. No. 28164, U.S.N.M. Other specimens collected by Mr. R. W. Porter are now in the American Museum of Natural History.

[1] Geol. Minn., III, Pt. 2, 1894, p. 597, pl. XLII, figs. 31–33.

CTENODONTA BAFFINENSIS, new species (Ulrich).

(Plate XIII, figs. 7–10.)

There is but a single example of this species present, and this was provisionally identified as *C. scofieldi* Ulrich.[1] The author of the species writes that, while it has the general aspect of *C. scofieldi*, it is nevertheless sufficiently distinct to be recognized as new. Mr. Ulrich has made the following comparisons:

> At first sight this is extremely like *C. scofieldi*, but on closer inspection, and particularly when compared with the types of that species, certain peculiarities become so prominent that I wonder that they were not observed at once. The first of these is a depression, or rather widening furrow, extending vertically from the beaks across the valves. This is sufficient to cause a straightening, even a slight concavity, in the ventral outline. The outline of the valves differs further in the postventral (wider) region being more prominent and more narrowly rounded here. In a cardinal view the species agrees best with *C. scofieldi*, but in a lateral view the outline corresponds better with *C. medialis* and *C. nitida* Ulrich. The contour of the valves, however, shows it to be a distinct form, the mesial depression possibly indicating relations to species of the type *C. carinata* Ulrich. *C. scofieldi* also has no radiating lines; the concentric lines are equally as delicate.

Collector.—R. W. Porter. The type is in the American Museum of Natural History.

CTENODONTA FROBISHERENSIS, new species.

(Plate XIII, figs. 11–14.)

Of this little shell there are two well-preserved specimens, which appear to be distinct from all other Ordovician Ctenodontas. Probably the species most nearly related is *C. albertina* Ulrich,[2] from which it differs in having the beaks more centrally situated, the valves shallower, and in being less drawn out anteriorly. At first this form was thought to be most closely related to *C. oviformis* Ulrich,[3] but the author of the latter species writes that the Arctic shell "has different proportions" and that it represents a new species. *C. oviformis* is less high, has narrowly rounded ends, and the beaks are situated nearer the midlength. Its rounded-ovate form distinguishes it from the other Frobisher Bay species, all of which are nasute forms.

Collectors.—J. N. Carpender and A. V. Shaw. Cat. No. 28165, U.S.N.M.

Family MODIOLOPSIDÆ Ulrich.

MODIOLODON ARCTICUS, new species.

(Plate XIII, figs. 18, 19.)

There is a good cast of the interior of the valves of this shell in the present collection. The species is very much like *M. patulus* Ulrich,[4]

[1] Geol. Minn., III, Pt. 2, 1894, p. 593, pl. XLII, figs. 53–58.
[2] Ibidem, p. 598, pl. XLII, figs. 76–82.
[3] Ibidem, p. 586, pl. XLII, fig. 29.
[4] Ibidem, p. 521, pl. XXXVII, figs. 20–24.

and was at first regarded by the writer as a variety of that form. *M. arcticus* is, however, nearer subquadrate than ovate, shorter and more erect, the post-cardinal portion more alate, and the beaks smaller and more pointed than in *M. patulus* Ulrich.

Collector.—J. N. Carpender. Cat. No. 28166, U.S.N.M.

WHITEAVESIA SYMMETRICUS, new species (Ulrich).

(Plate XIII, figs. 15–17.)

This little shell was thought by the writer to be probably identical with *Crytodonta affinis* var. *fillmorensis* Ulrich,[1] and for confirmation of this opinion sent the specimen to Mr. Ulrich. He, however, refers it to the genus *Whiteavesia* of the family Modiolopsidæ. As his notes are detailed, they are given at length.

Remains of the black ornament-bearing epidermis prove the specimen to belong to the Modiolopsidæ. It is a new species, with an anterior end reminding of *Modiolopsis arguta*, while the rest of the outline and general aspect is more nearly like *M. similis*. It is also like *M. obsoleta*, but it is too high posteriorly. It is, however, not a true *Modiolopsis*, the umbones being too prominent and full, the ventral outline convex, and the anterior muscular scars scarcely distinguishable in the cast. These characters make it a *Whiteavesia*, and it does not seem to be closely related to any of the described species of that genus. The rather uniform convexity of the valves is peculiar to this species.

Collector.—J. N. Carpender. Cat. No. 28162, U.S.N.M.

Family CYRTODONTIDÆ Ulrich.

CYRTODONTA SILLIMANENSIS, new species (Ulrich).

(Plate XIII, figs. 31–33.)

Mr. Ulrich has kindly made the following notes on this species:

Have compared this with every Cyrtodonta known to me without finding one with which it is identical. In a general way it reminds of *C. affinis*, *C. parva*, and *C. halli*,[2] but am satisfied it is not closely related with any of that group of species. Its true affinities seem to be with *C. subcarinata* Billings, but is readily distinguished by its shorter form and much broader posterior. From *C. huronensis* Billings,[3] which I regard as another close ally (also *C. billingsi* Ulrich [2]), it differs not only in size but in its greater convexity and much better defined antero-median sulcus. The specimen is preserved in part as a cast of the interior, and I am therefore inclined to doubt that the sulcus is as strongly defined on the exterior of the shell as shown on the specimen.

Collector.—J. N. Carpender. Cat. No. 28159, U.S.N.M.

CYRTODONTA (?) GIBBERA Ulrich, variety.

(Plate XIII, figs. 34–36.)

Cyrtodonta gibbera ULRICH, Geol. Minn., III, Pt. 2, 1894, p. 542, pl. XXXIX, figs. 13–15.

The only example of this species was sent by the writer to Mr. Ulrich, who made the following comparisons:

[1] Geol. Minn., III, Pt. 2, 1894, p. 540, pl. XXXIX, fig. 23.
[2] Ibidem.
[3] Canadian Nat. and Geol., III, 1858, p. 432.

It differs from my type specimen, which is a cast of the exterior, in being somewhat less gibbous, particularly in the umbones, the beaks also coming closer, i. e., they are almost in contact, while they are rather widely separated and less incurved in the type.

In the absence of evidence concerning the hinge, the generic position of the shell is necessarily doubtful. Therefore, although admitting provisionally that it is closely allied to *Cyrtodonta gibbera*, I am not at all satisfied that it will not turn out to be a *Vanuxemia* near *V. abrupta*.

Collector.—J. N. Carpender. Cat. No. 28161, U.S.N.M.

VANUXEMIA ABRUPTA Ulrich.

Vanuxemia abrupta ULRICH, Geol. Minn., III, Pt. 2, 1894, p. 560, pl. XXXVIII, figs. 39–44.

Of this species there are two examples, which Mr. Ulrich has compared with the types. In Minnesota this form is found in the Middle Galena of Fillmore and Goodhue counties.

Collector.—J. N. Carpender. Cat. Nos. 28157, 8, U.S.N.M.

VANUXEMIA BAFFINENSIS, new species.

(Plate XIII, figs. 26–28.)

This species finds its nearest relatives in *V. hayniana* Safford and *V. niota* (Whitfield[1]). It dffiers from these species in the greater obliquity of the shell. The largest specimen figured (figs. 29 and 30) is a worn example, and is provisionally referred to *V. baffinensis* as a variety. When additional material is secured, it may prove to be a distinct species. (Another specimen just received from Mr. A.V. Shaw shows that the variety is probably a distinct species.)

Collector.—J. N. Carpender. Cat. No. 28160, U.S.N.M.

WHITELLA ARCTICUS, new species.

(Plate XIII, figs. 23–25.)

Ulrich writes that this species of *Whitella* is nearest his *W. rugatina*,[2] from which it differs in being much more erect. In fact, *W. arcticus* is more erect than any other species of the genus. The escutcheon is very narrow.

Collector.—J. N. Carpender. Cat. No. 33059, U.S.N.M.

Family GRAMMYSIIDÆ Hall.

SAFFORDIA MODESTA Ulrich.

Saffordia modesta ULRICH, Geol. Minn., III, Pt. 2, 1894, p. 627, pl. XLI, figs. 29–31.

Of this form there are two specimens in the American Museum of Natural History, collected by Mr. R. W. Porter. Externally they agree with the Minnesota species.

[1] See Geol. Minn., III, Pt. 2, 1894, p. 560.

[2] Ibidem, p. 569, pl. XLI, fig. 1.

Class GASTROPODA.

Family PROTOWARTHIIDÆ Ulrich.

PROTOWARTHIA PERVOLUTA Ulrich and Scofield.

Protowarthia pervoluta ULRICH and SCOFIELD, Geol. Minn., III, Pt. 2, 1897, p. 871, pl. LXIII, figs. 21–27.

This species is fairly common at Silliman's Fossil Mount, and in some specimens the shell is preserved. Testiferous examples of *P. pervoluta* are distinguished from other species of the genus by the columella-like development of the inner lip. The specimens were sent to Mr. Ulrich, who has compared them with his types. He writes that the Arctic examples are somewhat more angular on the back of the volutions than the type specimens.

Collectors.—J. N. Carpender and A. H. White. Cat. No. 28173, U.S.N.M.

Family BUCANIIDÆ Ulrich.

TETRANOTA OBSOLETA Ulrich and Scofield.

Tetranota obsoleta ULRICH and SCOFIELD, Geol. Minn., III, Pt. 2, 1897, p. 880, pl. LXV, figs. 19–23.

Of this widely distributed shell there are eight examples in the present collection. Three were sent to Mr. Ulrich, who pronounced them typical examples of his *T. obsoleta*.

In the United States, this shell ranges from the Lowville stage into the Utica, and is found in Minnesota, Wisconsin, Kentucky, and at Cincinnati, Ohio.

Collectors.—J. N. Carpender and A. H. White. Cat. No. 28175, U.S.N.M. Three specimens collected by Mr. R. W. Porter are in the American Museum of Natural History.

KOKENIA COSTALIS Ulrich and Scofield.

Kokenia costalis ULRICH and SCOFIELD, Geol. Minn., III, Pt. 2, 1897, p. 882, pl. LXIV, figs. 46–49.

Two specimens of this interesting species, from the Galena shales of Goodhue County, Minnesota, the type locality for this species, are in the United States National Museum. The two specimens from Frobisher Bay agree with the present examples in every way excepting in the number of revolving lines. Of these there are seven in the Minnesota specimens, while in the Arctic individuals there are from eleven to twelve, of which the fourth, sixth, and eighth are the most prominent. The first, second, fourth, sixth, and eighth revolving lines are continuous into the aperture, the others being interpolated on the last volution. Extremely fine transverse lines of growth and a few varices indicating stages of growth are also present.

Collector.—J. N. Carpender. Cat. No. 28176, U.S.N.M.

Family BELLEROPHONTIIDÆ.

BELLEROPHON SIMILIS Ulrich and Scofield.

Bellerophon similis ULRICH and SCOFIELD, Geol. Minn., III, Pt. 2, 1897, p. 919, pl. LXIV, figs. 31–39.

Of this species there are two examples, one of which is identical with Ulrich's figures thirty-two and thirty-three of the work cited. It is one of the characteristic fossils of the Trenton or Galena stage of Minnesota.

Collector.—A. H. White. Cat. No. 28174, U.S.N.M.

Family PLEUROTOMARIIDÆ d'Orbigny.

LOPHOSPIRA SPIRONEMA Ulrich and Scofield.

Lophospira spironema ULRICH and SCOFIELD, Geol. Minn., III, Pt. 2, 1897, p. 983, pl. LXXII, figs. 44–47.

This is the most abundant gastropod found at Silliman's Fossil Mount. The species was at first thought by the writer to be *L. fillmorensis* Ulrich and Scofield, but Mr. Ulrich, to whom three examples were sent, pronounced it *L. spironema*. The Arctic examples attained a far larger size than the Black River specimens of Minnesota.

Collectors.—A. H. White and J. N. Carpender. Cat. No. 28177, U.S.N.M. Other specimens collected by R. W. Porter are in the American Museum of Natural History.

LIOSPIRA AMERICANA (Billings).

Liospira americana ULRICH and SCOFIELD, Geol. Minn., III, Pt. 2, 1897, p. 996.

This very widely distributed and common species is abundant at Silliman's Fossil Mount. The large umbilicus is completely filled with shell matter, but above in the earlier whorls it is open.

Collectors.—A. H. White, A. V. Shaw, J. N. Carpender, and R. W. Porter. Cat. No. 28180, U.S.N.M.

CLATHROSPIRA CONICA Ulrich and Scofield.

Clathrospira conica ULRICH and SCOFIELD, Geol. Minn., III, Pt. 2, 1897, p. 1008, pl. LXX, figs. 1–4.

This is one of the abundant species at Silliman's Fossil Mount, and in the United States ranges from the Black River group into the middle of the Cincinnatian group. The Arctic examples attained a larger size than elsewhere, but otherwise are considered by Mr. Ulrich to be in harmony with his species.

Collectors.—J. N. Carpender, A. V. Shaw, and A. H. White. Cat. No. 28178, U.S.N.M. The American Museum of Natural History also has specimens collected by Mr. R. W. Porter.

SEELYA (?) (PLETHOSPIRA?) ULRICHI, new species.

(Plate XII, figs. 9, 10.)

This interesting little shell has many of the characteristics of *S. ventricosa* Ulrich,[1] from the Calciferous (Beekmantown) stage. It is, however, a much smaller shell, and differs from all known species of Seelya in having the revolving bands nearly obsolete.

There are four of these shells, which were sent to Mr. Ulrich for identification. He writes:

> The specimens are casts of the interior, and the revolving peripheral furrows probably have nothing to do with the revolving sculpture of the true *Seelya*. Similar furrows occur in good casts of *Lophospira bowdeni* and other Pleurotomariidæ. The band, I believe, was of the flat or concave type, as in *Seelya, Plethospira,* and *Hormotoma,* but, as it was evidently close to the suture and partly covered by same, it is too low on the whorls to be in strict accordance with these genera.

Collector.—A. H. White. Cat. No. 28187, U.S.N.M. The American Museum of Natural History has two specimens collected by Mr. R. W. Porter. The species is named for Mr. E. O. Ulrich, who has accomplished much in bringing about a better understanding of the fossils of the American Lower Silurian.

Family EUOMPHALIDÆ.

HELICOTOMA (?) (LIOSPIRA?) LARVATA Salter.

Helicotoma larvata BILLINGS, Canadian Organic Remains, Decade I, 1859, p. 15, pl. II, figs. 11-14.

Of this species there is a single excellent specimen, which the writer at first labeled *Liospira angulata* Ulrich, variety. However, when Ulrich compared the Arctic example with the type species he concluded it to be *Helicotoma larvata* Salter. He has kindly made the following notes on this specimen:

> This species resembles *Liospira mundula, L. angulata,* and other species of that section of this genus very greatly, and it may be, as I once thought, truly referable to *Liospira.* Excepting that the Arctic specimen is small, it is the best preserved yet seen by me. Still I am unable to settle the difficulty. Whatever light it casts upon the problem is in favor of retaining the species under *Helicotoma.*

In Canada this is a Black River species.

Collector.—A. H. White. Cat. No. 28179, U.S.N.M.

Family MACLURIIDÆ Woodward.

MACLURINA MANITOBENSIS (Whiteaves).

Maclurina manitobensis ULRICH and SCOFIELD, Geol. Minn., III, Pt. 2, 1897, p. 1041, pl. LXXVI, figs. 4, 5; pl. LXXXII, fig. 45.

This species is common at Silliman's Fossil Mount and attains a large size, one specimen measuring nearly 5 inches in diameter. In

[1] Geol. Minn. III, Pt. 2, 1897, p. 1009, figs. 7, *b, c, d,* in text.

Manitoba, it attains a diameter of 8½ inches. It is a characteristic species of the Trenton.

Collectors.—J. N. Carpender, A. V. Shaw, and A. H. White. Cat. No. 28183, U.S.N.M.

MACLURINA CUNEATA (Whitfield).

Maclurina cuneata ULRICH and SCOFIELD, Geol. Minn., III, Pt. 2, 1897, p. 1042, pl. LXXVI, figs. 1–3; pl. LXXXII, fig. 46.

Of this species there are two typical specimens with the characteristic, small umbilical perforation.

Collector.—J. N. Carpender. Cat. No. 28184, U.S.N.M.

MACLUREA CRASSA Ulrich and Scofield.

Maclurea crassa ULRICH and SCOFIELD, Geol. Minn., III, Pt. 2, 1897, p. 1040, pl. LXXV, figs. 12–14.

One example of this species measures nearly 3 inches in diameter, which is larger than the Minnesota specimens, but this is in keeping with the greater size attained by the Maclureas and Maclurinas in the far north.

Collectors.—J. N. Carpender and A. V. Shaw. Cat. No. 28182, U.S.N.M.

Family TROCHONEMATIDÆ Ulrich.

TROCHONEMA UMBILICATUM (Hall).

Trochonema umbilicatum ULRICH and SCOFIELD, Geol. Minn., III, Pt. 2, 1897, p. 1047, pl. LXXVII, figs. 1–3.

Of this widely distributed Lower Silurian shell, six specimens are present. They preserve most of the shell, and show considerable surface detail.

Collectors.—J. N. Carpender, A. V. Shaw, and A. H. White. Cat. No. 28186, U.S.N.M. Other specimens collected by Mr. R. W. Porter are in the American Museum of Natural History.

TROCHONEMA (EUNEMA) ROBBINSI Ulrich and Scofield.

Trochonema (Eunema) robbinsi ULRICH and SCOFIELD, Geol. Minn., III, Pt. 2, 1897, p. 1053, pl. LXXVI, figs. 11–15.

Three examples of this species are present, only one of which is well preserved. These were sent to Mr. Ulrich for comparison with *T. robbinsi* and *T. salteri*. He writes as follows:

> These specimens possibly indicate a form intermediate between *T. (E.) similis* and *T. (E.) robbinsi* Ulrich and Scofield. The upper whorls of the best specimen agree rather closely with the former, while the last whorl, with its relatively narrow peripheral band, is more in accordance with the latter species. It is to be borne in mind, however, that it is only the shell-less portion of the specimen that agree with *T. (E.) similis*, the opposite side of the same whorls showing no trace of the ridge near the suture, which is strongly developed and is characteristic of *T. similis*.

Collector.—J. N. Carpender. Cat. No. 28185, U.S.N.M. The best specimen was found by Mr. R. W. Porter, and is now in the American Museum of Natural History.

HOLOPEA ARCTICA, new species.

(Plate XII, figs. 14-16.)

This little Holopea has its nearest relation in *H. ampla* and *H. similis* Ulrich and Scofield.[1] It differs from the latter in having the upper sides of the whorls less flat, the sutures deeper, and the lines of growth more regular than in any other species of *Holopea*. From *H. ampla*, the Arctic species differs in having the whorls expand less rapidly.

Collector.—A. H. White. Cat. No. 28190, U.S.N.M.

? Family TROCHIDÆ.

TROCHUS (?), species undetermined.

(Plate XII, figs. 11-13.)

Of this form there is only one good specimen, and this has none of the ornamental surface preserved. The specimen was sent to Mr. Ulrich, and he kindly made the following notes:

I regard it as related to some of the Gotland shells referred to *Trochus* by Lindström, but as the specimen retains no trace of the sculpture-bearing layer of the shell it can not be compared satisfactorily with described species. Lindström's *T. densistriatus*, *T. kolmodini*, and *T. wisbyensis* seem not far removed.

The specimen is in the American Museum of Natural History.

Family SUBULITIDÆ.

FUSISPIRA INFLATA Meek and Worthen.

Fusispira inflata ULRICH and SCOFIELD, Geol. Minn., III, Pt. 2, 1897, p. 1075, pl. LXXX, figs. 17, 18.

The only example of this species is an imperfect shell with most of the smaller part of the spire missing. So far as comparison can be made, the species is in harmony with *F. inflata*. Mr. Ulrich agrees that the specimen belongs to this species.

Collector.—J. N. Carpender. Cat. No. 28189, U.S.N.M.

FUSISPIRA NOBILIS Ulrich and Scofield.

Fusispira nobilis ULRICH and SCOFIELD, Geol. Minn., III, Pt. 2, 1897, p. 1078, pl. LXXX, figs. 2-4.

The two Arctic specimens of this form are imperfect, and the largest fragment indicates that the species here attained as large a growth as in Minnesota, being about 4 inches in length. Mr. Ulrich has seen the fragments and agrees that they represent his species.

[1] Geol. Minn., III, Pt. 2, 1897, pp. 1065, 1066.

Class CEPHALOPODA.

Order TETRABRANCHIATA.

Family ENDOCERATIDÆ.

CAMEROCERAS PROTEIFORME (Hall).

Cameroceras proteiforme CLARKE, Geol. Minn., III, Pt. 2, 1897, p. 777, pls. XLVIII–LI, LIII.

Of this common species there is one small but well-preserved fragment showing the submarginal siphon. In a length of 2 inches, there are seven chambers and eight septa.

Collector.—J. N. Carpender. Cat. No. 28191, U.S.N.M.

Family ORTHOCERATIDÆ.

ORTHOCERAS OLORUS Hall, var. BAFFINENSIS, new variety.

(Plate XII, figs. 19–22.)

Orthoceras vertebrale HALL, Pal. N. Y., I, 1847, p. 201, pl. XLIII, figs. 5–5c (not Schlotheim, 1820).

Orthoceras olorus HALL, Miller's Amer. Pal. Foss., 1st ed., 1877, p. 245.

The Arctic examples of this form, of which there are three, do not appear to attain the large size of the New York specimens. Hall describes the species with "strong longitudinal striæ," while the Arctic specimens have very fine equidistant lines, between each of which are from 3 to 6 exceedingly delicate ones. This difference in the ornamentation, together with the smaller size, is regarded of sufficient importance for varietal distinction. There is no other American Lower Silurian annulated species with which it can be compared.

Collectors.—J. N. Carpender and A. H. White. Cat. No. 28192, U.S.N.M.

ORTHOCERAS BILINEATUM Hall.

Orthoceras bilineatum CLARKE, Geol. Minn., III, Pt. 2, 1897, p. 786, pl. XLVII, figs. 20, 21; pl. LIV, figs. 6, 7.

Of this species there is one small specimen annulated throughout. The characteristic, regularly alternating, larger and smaller lines of ornamentation are preserved.

Collector.—A. H. White. Cat. No. 28193, U.S.N.M.

ORTHOCERAS PORTERI, new species.

(Plate XII, figs. 23–25.)

This annulated species of Orthoceras appears to be related to *O. bilineatum*. The apical angle in both is about the same, but in *O. porteri* the annulations and septa are farther apart, the siphuncle is more eccentric, and the ornamentation is entirely different. The longitudinal lines are double throughout, and consist of prominent primary ones,

between which there are always three equally strong secondary lines. Transverse, or growth, lines are fine and numerous, and in crossing the longitudinal lines they cause these to be slightly nodose.

Collector.—J. N. Carpender. Cat. No. 28194, U.S.N.M.

This name is given as a mark of appreciation to Mr. Russell W. Porter, of Boston, Massachusetts, who, with his associates, made it possible to revisit Frobisher Bay and to make a most complete collection of Arctic Trenton fossils.[1]

ORTHOCERAS SCALARIFORMIS, new species.

(Plate XII, figs. 17, 18.)

Shell small, not annulated, tapering slowly, with an apical angle of about 7°, section originally circular, septa 9 in the length of 1 inch; siphuncle large, and apparently in contact with the outer wall. Surface with 13 widely separated prominent longitudinal costæ, which are crossed somewhat irregularly by concentric lamellæ, anteriorly directed, and 1 to each septum. Here and there two or three intermediate vertical lines occur between the longitudinal costæ.

Collector.—J. N. Carpender. Cat. No. 28195, U.S.N.M.

Family CYRTOCERATIDÆ.

CYRTOCERAS MANITOBENSE Whiteaves.

Cyrtoceras manitobense WHITEAVES, Trans. Royal Soc. of Canada, Sec. 4, VII, 1889, p. 80, pl. XIII, figs. 3, 4; pl. XV, fig. 4; Geol. Surv., Canada, Pal. Foss., III, 1897, p. 223.

Oncoceras manitobense CLARKE, Geol. Minn., III, Pt. 2, 1897, p. 799.

This species is the most abundant of the Cephalopoda at Silliman's Fossil Mount. The writer sent the specimens to Professor Whiteaves, who compared them with the types, and subsequently reported that they are "apparently exactly the same species as *C. manitobense* Whiteaves from Lake Winnepeg, Manitoba. We have very similar specimens from Akpatok Island, Hudson Strait." The Baffin Land specimens are smaller than those from Manitoba.

Collectors.—J. N. Carpender, A. V. Shaw, and A. H. White. Cat. No. 28119, U.S.N.M.

CYRTOCERAS CORNULUM, new species.

(Plate XIV, figs. 8–10.)

This little shell is clearly related to the previous species, having many of its characters. It differs, however, in its smaller growth, greater curvature, and most decidedly in the very rapid increase of the cone. The greater curvature is due to the rapid increase in depth of the air chamber toward the ventral side, where near the living chamber it is

[1] A description of this trip is given by Mr. Porter in Bull. Amer. Geog. Soc., XXX, May, 1898, pp. 97–110, the paper being entitled "Frobisher Bay Revisited."

often three times the depth on the dorsal side. The siphuncle is very small, almost in contact with the ventral wall, and swells but little between the septa.

Professor Whiteaves, who saw the type, states that among the fragments of *Cyrtoceras* from Manitoba "are some apparently like *C. cornulum* in section, curvature, and much in the position of siphuncle."

Collectors.—A. V. Shaw and A. H. White. Cat. No. 28121, U.S.N.M.

CYRTOCERAS BAFFINENSIS, new species.

(Plate XIV, figs. 11–13.)

This small species of Cyrtoceras has the general aspect of *C. manitobense*, and for a time was regarded as the young of that species, yet a comparison shows that *C. baffinensis* has a somewhat smaller apical angle. The diagnostic feature, however, is in the depth of the air chambers. These are much more shallow and do not increase in depth with growth nearly as rapidly as in *C. manitobense*, there being twenty-two of these in 25 mm., while in the latter species at a similar stage of growth there are about sixteen.

Collector.—A. H. White. Cat. No. 28198, U.S.N.M.

Family ONCOCERATIDÆ.

CLINOCERAS EXIGUUM (Billings).

Cyrtoceras exiguum BILLINGS, Can. Nat. and Geol., V, 1860, p. 172, figs. 17, 18.
Oncoceras exiguum CLARKE, Geol. Minn., III, Pt. 2, 1897, p. 798, pl. LVIII, figs. 10, 11.

In this collection there are five specimens of this species, three of which preserve more or less of the body chamber, and permit a reconstruction of the form of the shell. The body chamber was not less than 15 mm. in length and the entire shell not less than 58 mm. Billings gives the probable length as about 50 mm., which is very close to the protraction based on Arctic material. Clarke writes that the Minnesota specimens probably did not exceed 30 mm., but as his specimens are very small fragments, this estimate is probably short of the actual length. The first twelve septa back of the living chamber occupy 22 mm., and in another specimen there are nine in 19 mm. The depth of the air chambers decreases very little toward the apex, the average being a little less than 2 mm. down to where the shell has a diameter of 3.5 mm.

Specimens from shale are usually compressed, and this is the condition of the Arctic material, but the shell was circular in outline, with a very small central siphuncle.

This species is related to *Oncoceras mumiæformis* Whitfield, which Clarke referred to *Clinoceras*. The Arctic material shows the shell to be gently arcuate and to possess the other generic characters of *Clinoceras*. Billings's species should be referred to Maschke's genus.

Collectors.—J. N. Carpender and A. H. White. Cat. No. 28199, U.S.N.M.

ONCOCERAS ARCTICUM, new species.

(Plate XIV, figs. 4–7.)

As shown by the figures, this species differs from all other American *Oncoceras* in the great antero-posterior curvature of the ventral side of the shell. This is caused by the rapidly increasing depth of the air chambers toward the ventral side, where they are about twice the depth of the dorsum. Siphuncle small, slightly constricted at each septum, and closely adjoining the ventral wall except immediately beneath the living chamber, where it is slightly deflected dorsally. Venter more broadly rounded than the dorsum. Living chamber large, with the sides slightly constricted, not less than 24 mm. deep, 33 mm. dorso-ventrally, and 24 mm. transversely. The cast is smooth and preserves no markings of the exterior.

Cyrtoceras cornulum was first thought to be the young stage of *Oncoceras arcticum*, but its section is more elongate-oval, with the dorsal side more rounded, the reverse being true in the latter species. The chambers also are deeper on the ventral side, the ventral curvature is less strong, and the shell thicker, with longitudinal plications.

Collector.—J. N. Carpender. Cat. No. 28196, U.S.N.M.

ONCOCERAS TUMIDUM, new species.

(Plate XIV, figs. 1-3.)

This species is much larger than any other in the Trenton of the United States, although much smaller than *O. magnum*, the giant of the genus, which is found at East Selkirk, in Manitoba. The present form seems to be most closely related to *O. gibbosum* Whiteaves[1] (=*O. whiteavesi* Miller), but has not the numuloidal siphuncle of that species, nor the sigmoid outline of the septa on the dorsum. The living chamber, also, is shallower, being about 28 mm. deep. The constriction of *O. tumidum* recalls that seen in *Poterioceras* or *Gomphoceras*, but unlike these shells is not bilaterally symmetrical. The specimen preserves but 6 septa and the living chamber, and throughout all there is a rapid regular convergence toward the anterior end. Dorsal end of shell broadly rounded, with the ventral side somewhat acutely rounded. The 5 air chambers are dorsally 13 mm. deep and ventrally 25 mm. The siphuncle is small and situated about 6 mm. inside the ventral wall. Septa regularly but deeply concave.

The type specimen was sent to Professor Whiteaves for comparison with *O. whiteavesi* Miller. He reports that *Oncoceras tumidum* is "very much like *O. whiteavesi* Miller (=*O. gibbosum* Whiteaves, not Hall) in lateral contour, but in your specimen the body chamber does not seem to narrow so abruptly as it always does in *O. whiteavesi*, and shows no sign of any constriction at the aperture."

Collector.—J. N. Carpender. Cat. No. 28190, U.S.N.M.

[1] Trans. Royal Soc. Canada, Sec. 4, IV, 1889, p. 80, pl. XV, fig. 43.

POTERIOCERAS, species undetermined.

There is a poor specimen of this genus from the Frobisher Bay locality. It was thought to be a small specimen of *P. nobile*, and was therefore sent to Professor Whiteaves[1] for comparison. He, however, writes:

> We have nothing exactly like this. It is very similar in shape to *P. nobile*, except that the latter is somewhat compressed and yours is not. The difference in size between your specimen and ours is, of course, enormous. Your shell also is not very unlike the so-called *Gomphoceras eximium* Billings, but that species is ovate in transverse section, possibly from lateral pressure. Your specimen is, I should think, most likely a *Poterioceras*, but too imperfect to show its specific characters or affinities.

Collector.—J. N. Carpender. Cat. No. 28122, U.S.N.M.

Family TARPHYCERATIDÆ Hyatt.

EURYSTOMITES PLICATUS Whiteaves?

Eurystomites plicatus WHITEAVES, Can. Rec. Sci., VI, 1896, p. 395; Geol. Surv. Canada, Pal. Foss., III, Pt. 3, 1897, p. 225, figs. 15, 16; pl. XXVII, fig. 2.

The only specimen of this species present is not well preserved, but has parts of one and one-half whorls. Professor Whiteaves, who saw the specimen, writes that it is "probably *Eurystomites plicatus* Whiteaves. At any rate, it has the same outline in transverse section, with the dorsum impressed by a shallow and rather narrow furrow of contact, and the same amount of involution." The specimen, however, shows no surface markings nor any siphuncle.

Collector.—J. N. Carpender. Cat. No. 28123, U.S.N.M.

Class ARTHROPODA.

Subclass CRUSTACEA.

Order OSTRACODA.

Ostracoda are abundant at Silliman's Fossil Mount, 10 specimens having been found attached to the larger fossils. These were sent to Mr. E. O. Ulrich for determination. He has identified them as follows:

Bythocypris granti Ulrich.[2]
Primitia or *Klædenia*.
Krausella, two new species.

Order TRILOBITA.

NILEUS VIGILANS (Meek and Worthen).

Nileus vigilans CLARKE, Geol. Minn., III, Pt. 2, 1894, p. 712, figs. 17–19.

Of this widely distributed species there is one very fine enrolled but small specimen and fragments of three other individuals. These agree exactly with Mr. Clarke's description and figures.

[1] Trans. Royal Soc. Canada, Sec. 4, VII, 1889, p. 77, pl. XIV, fig. 1.
[2] Geol. Minn., III, Pt. 2, 1894, p. 689, pl. XLIV, figs. 39–42.

Collectors.—J. N. Carpender, A. V. Shaw, and A. H. White. Cat. No. 28168, U.S.N.M. The American Museum of Natural History has two specimens collected by Mr. R. W. Porter.

ILLÆNUS CRASSICAUDA AMERICANUS (Billings).

Illænus americanus CLARKE, Geol. Minn., III, Pt. 2, 1894, p. 714, figs. 20–23.

One fine enrolled specimen of this well-known species was found by Mr. F. G. Goodridge, of New York City, and was very kindly given to the U. S. National Museum. Mr. R. W. Porter also collected two fine specimens, which are now in the American Museum of Natural History. These agree excellently with this species, the best examples of which are from Trenton Falls, New York.

Collectors.—F. G. Goodridge, J. N. Carpender, A. V. Shaw, and A. H. White. Cat. No. 28167, U.S.N.M.

ISOTELUS GIGAS De Kay.

Isotelus gigas CLARKE, Geol. Minn., III, Pt. 2, 1894, pp. 701–706, with text figures.

Of this species several fragments were found by J. N. Carpender and A. V. Shaw.

DALMANITES (PTERYGOMETOPUS) GOODRIDGII, new species.

(Plate XII, figs. 5, 6.)

The cephalon of this species recalls that of *D.* (*P.*) *eboraceus* Clarke in the characters of the glabella and in the great prominence of the eyes. However, in *D.* (*P.*) *goodridgii*, the eyes are even more elevated, the cephalon is smooth and devoid of all granulation, while the most marked difference is seen in the posterior outline of the head, which is broadly rounded or subquadrate, with a central, short projection. The occipital ring is also much wider, and is strongly elevated medio-posteriorly into an obtuse apex. Of thoracic segments, nine are preserved in these specimens.

The pygidium is likewise less triangular than in *D.* (*P.*) *eboraceus*, and while there are ten or eleven annulations on the axis, there are not more than five pleuræ. These are well developed anteriorly, becoming rapidly more and more obsolete.

Named for Mr. F. G. Goodridge, of New York City, one of the collectors of fossils on the Peary expedition of 1897.

Collectors.—J. N. Carpender and A. H. White. Cat. No. 28170, U.S.N.M.

CERAURUS PLEUREXANTHEMUS Green.

Ceraurus pleurexanthemus GREEN, Pal. N. Y., I, 1847, p. 242, pl. LXV, figs. 1*a*–1*n*; pl. LXVI, figs. 1, 1*e*–1*h*.—CLARKE, Geol. Minn., III, Pt. 2, 1894, p. 734.

There are three examples of this species in the collection, none of which are entire, but all agree well with New York specimens. The species did not here attain quite the large size of New York specimens, but one glabella shows a growth about two-thirds of the largest from the latter locality.

Collector.—A. H. White. Cat. No. 28169, U.S.N.M.

SUMMARY.

The only Lower Silurian horizons known in northeastern Arctic America are of Trenton and Utica age. The latter zone appears only on the north shore of Frobisher Bay, but the Trenton is found in various places from the north shore of Hudson Strait to latitude 81° north. The Lower Silurian is thickest on Akpatok Island, where it is from 400 to 500 feet in depth. Dr. Bell, however, estimates the entire thickness of these strata in this region to be not less than 900 feet.

In Baffin Land, and apparently elsewhere in Arctic America, the Lower Silurian strata rests unconformably on old crystalline rocks. To the north of Baffin Land, the former are overlain by beds of Niagara or Wenlock age.

The Trenton faunas, occurring in various places around the insular Archæan nucleus of North America, have much in common, and this indicates that the conditions at that time were very similar, while the sea was in communication throughout. As yet, however, the distribution of the strata, together with their faunas, are well known only to the south and southeast of the Archæan nucleus, yet that of the west (Manitoba) and of the northeast (Baffin Land) show direct communication.

The Baffin Land fauna had an early introduction of Upper Silurian genera in the corals *Halysites*, *Lyellia*, and *Plasmopora*. In Manitoba similar conditions occur in the presence of *Halysites*, *Favosites*, and *Diphyphyllum*. Other Upper Silurian types do not appear to be present.

The Trenton fauna of Silliman's Fossil Mount, at the head of Frobisher Bay, has seventy-two species, of which twenty-eight are restricted to it. This fauna shows an intimate relationship with that of the Galena of Minnesota, Iowa, and Wisconsin. Fifty-seven per cent of the species of Baffin Land also occur in the Galena of the regions just mentioned.

The Trenton fauna of Baffin Land shows that the corals, brachiopods, gastropods, and trilobites have wide distribution, and are therefore less sensitive to differing habitats apt to occur in widely separated regions. On the other hand, the cephalopods, and particularly the pelecypods, indicate a shorter geographical range. The almost complete absence of Bryozoa in the Baffin Land Trenton contrasts strongly with the great development of these animals in Minnesota and elsewhere in the United States.

EXPLANATION OF PLATES.

[From drawings by Mr. E. O. ULRICH.]

PLATE XII.

Porocrinus shawi, p. 155.

Fig. 1. Posterior view of the calyx; enlarged.
2. Anterior view; natural size.
3. Ventral view; enlarged.

Dalmanites (Pterygometopus) goodridgii, p. 174.

4. The pygidium supposed to be of this species.
5, 6. Two views of the cephalon.

Orthis (Dinorthis) meedsi arctica, p. 157.

7, 8. Dorsal and profile views.

Seelya (?) (Plethospira ?) ulrichi, p. 166.

9, 10. Two views showing the nearly obsolete revolving bands.

Trochus ?, species undetermined, p. 168.

11–13. Three views of the only specimen of this genus.

Holopea arctica, p. 168.

14, 15. Two views of the best specimen.
16. Surface ornamentation; x5.

Orthoceras scalariformis, p. 170.

17. The ornamentation.
18. Sectional view, with the position of the sipho.

Orthoceras olorus baffinensis, p. 169.

19, 21, 22. Views of three specimens.
20. Surface ornamentation; x10.

Orthoceras porteri, p. 169.

23. View of the exterior.
24. Surface ornamentation; x5.
25. Sectional view, with the position of the sipho.

PLATE XIII.

Ctenodonta carpenderi, p. 160.

FIGS. 1–3. Three views of the largest specimen.

Ctenodonta subnasuta Ulrich ?, p. 160.

4–6. Three views of the best specimen.

Ctenodonta baffinensis, p. 161.

7–9. Three views of the type specimen.
10. Surface ornamentation; x10.

Ctenodonta frobisherensis, p. 161.

11–13. Three views of the best specimen.
14. Left valve of another specimen.

Whitearesia symmetricus, p. 162.

15–17. Three views of the type specimen.

Modiolodon arcticus, p. 161.

18, 19. Views of the cast of the interior.

Allodesma (?) species undetermined.

20–22. Three views of the only specimen. This species is for the present not described.

Whitella arcticus, p. 163.

23–25. Three views of the type specimen.

Vanuxemia baffinensis, p. 163.

26–28. Three views of the type specimen.
29, 30. Two views of a large specimen which probably is a distinct form.

Cyrtodonta sillimanensis, p. 162.

31–33. Views of the type specimens.

Cyrtodonta (?) *gibbera* Ulrich, var., p. 162.

34–36. View of the only example.

PLATE XIV.

Oncoceras tumidum, p. 172.

Fig. 1. Ventral side.
2. Side view.
3. Sectional view of the larger end.

Oncoceras arcticum, p. 172.

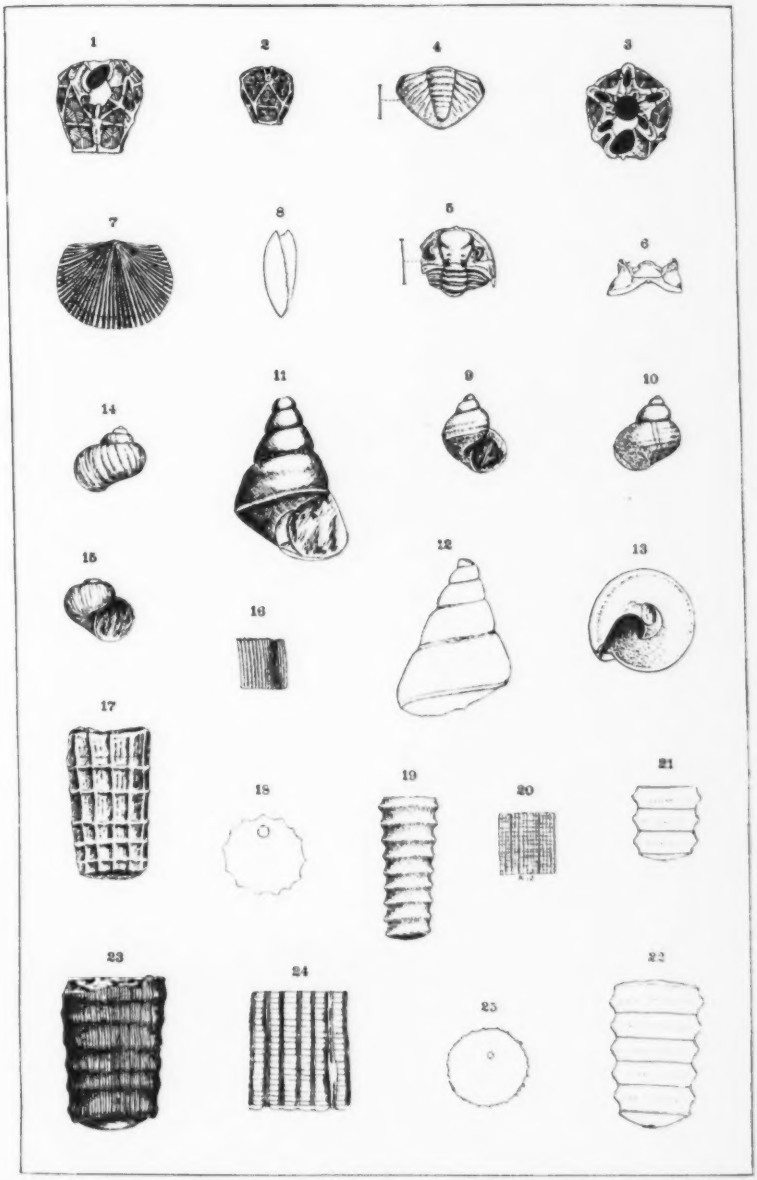
4. View of the dorsum.
5. Side view.
6. Sectional view, with the position of the sipho.
7. Ventral side.

Cyrtoceras cornulum, p. 170.

8. Side view, showing the radiating furrows of the inner side of the shell.
9. Ventral view.
10. Outline of the shell transversely.

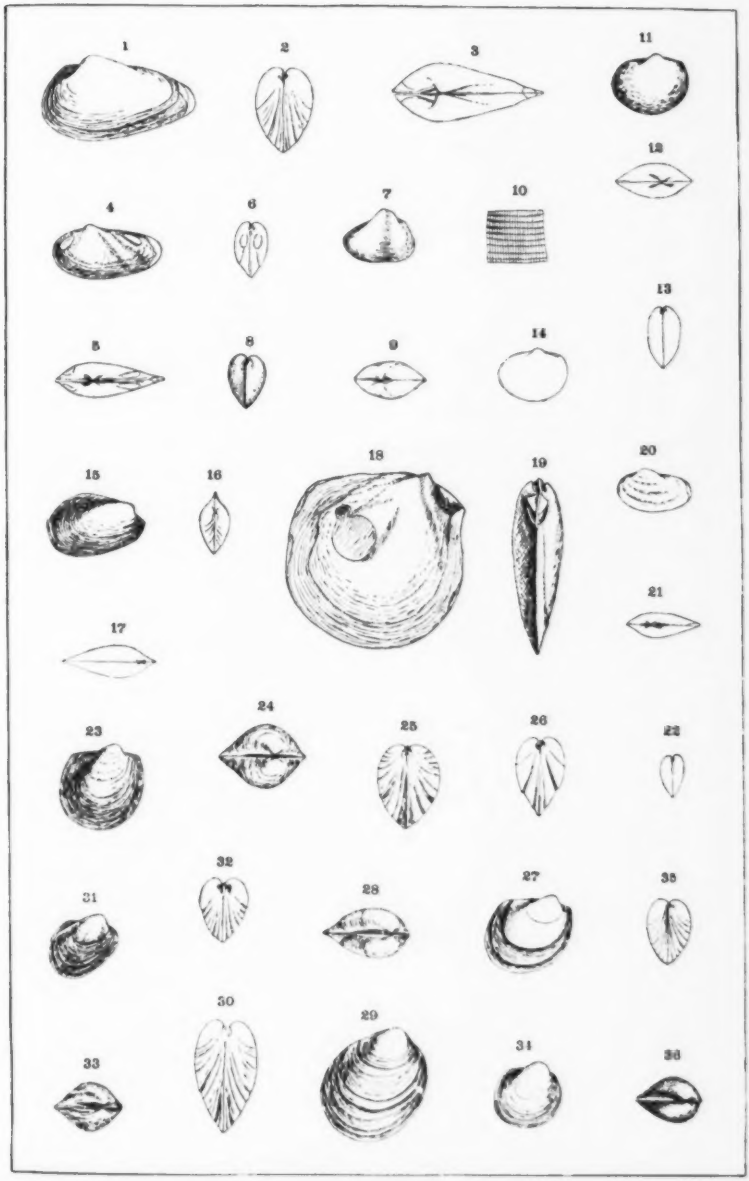
Cyrtoceras baffinensis, p. 171.

11. Side view.
12. Ventral view.
13. End view with about half the length of the shell drawn in.



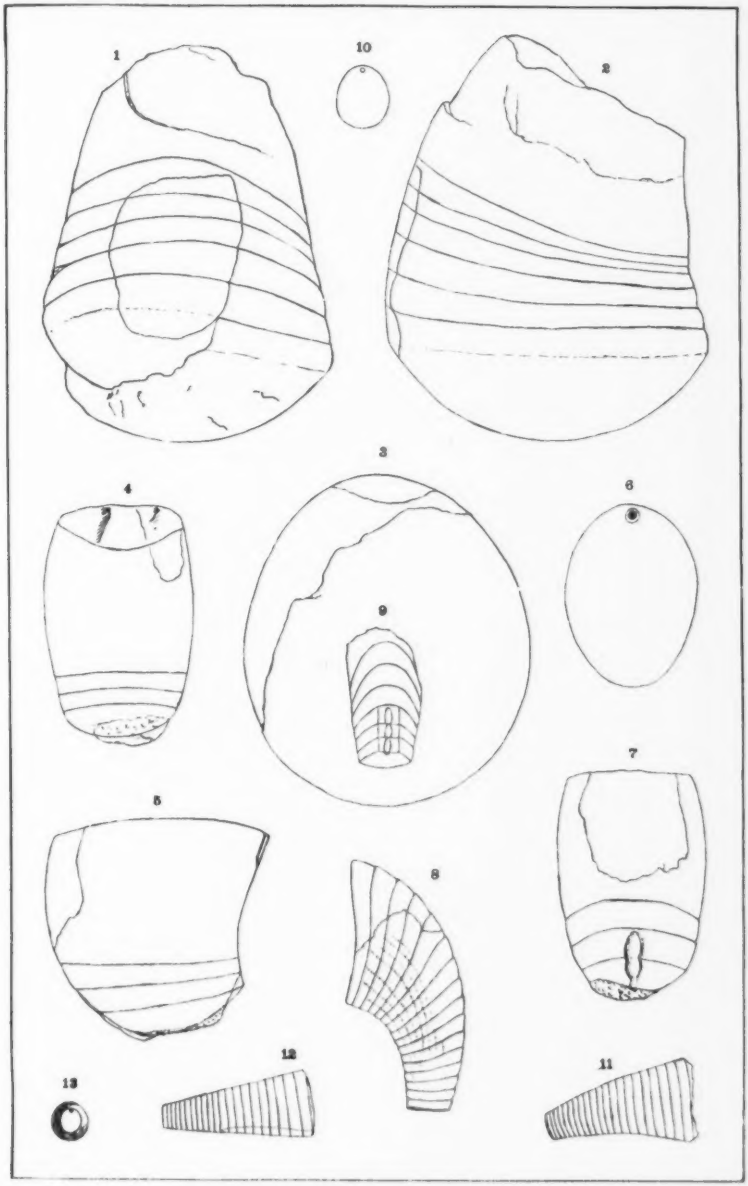
FOSSILS FROM SILLIMAN'S MOUNT.

FOR EXPLANATION OF PLATE SEE PAGE 176.



PELECYPODS FROM SILLIMAN'S MOUNT.

FOR EXPLANATION OF PLATE SEE PAGES 176, 177.



CEPHALOPODS FROM SILLIMAN'S MOUNT.

FOR EXPLANATION OF PLATE SEE PAGE 177.

SOME NEOCENE CORALS OF THE UNITED STATES.

By HENRY STEWART GANE, Ph. D.,
Fellow in Geology, Johns Hopkins University, 1894–95.

INTRODUCTION.

At the suggestion of Prof. William B. Clark, of the Johns Hopkins University, the writer was encouraged to undertake the study and systematic description of the Neocene corals of the United States. Furthermore, the present paper has been constructed both as to method of treatment and arrangement of subject-matter upon the general plan of Professor Clark's bulletin on the Mesozoic Echinodermata of this country.

No attempt had been made hitherto to treat this subject from the present standpoint, the few corals previously described being offered to science either as possessing only zoological interest, or else to complete a local fauna.

The first mention of a Neocene coral from this country is found in the Petrefacta Germaniæ of Goldfuss (1829), where *Madrepora palmata* is both described and figured. During the thirty years following this first description there were at irregular intervals a number of scattered contributions to the subject. The more important were those of T. A. Conrad, W. Lonsdale from the collections made by Sir Charles Lyell, and Milne-Edwards and Jules Haime. More recently there have been but two papers worthy of notice, one in 1887 by Prof. P. M. Duncan on the genus *Septastræa* d'Orbigny, from the Miocene of Maryland, and one in 1888 by Dr. G. J. Hinde as a criticism of Professor Duncan's article. It is of interest to note that the researches of Dr. Hinde on this American species are almost unprecedented, no similar coral having been treated in so exhaustive a manner. In considering all the references we notice the somewhat remarkable fact that by far the most important writings have appeared both in foreign journals and from the pens of foreign paleontologists.

The material treated has been loaned to the writer from the collections of the U. S. National Museum, Wagner Free Institute of

Science, the Philadelphia Academy of Sciences, the private cabinet of Mr. Joseph Willcox, of Philadelphia, and the Johns Hopkins University. The state of preservation of the forms is as a rule excellent, with the exception of the silicified corals from Florida. These latter are often very difficult of determination, owing to prefossil wear and the mineralogical change the specimens have since undergone. Frequently the poorly preserved calices alone remain, the entire inside of the individual or the colony being dissolved away and represented by a cavity with walls of botryoidal character. When the original substance of the coral, with the exception of the outer surface, is thus replaced, it becomes impossible, as an aid to identification, to cut sections showing the coral structure below the calice. The cause and method of silification of these corals has never been satisfactorily proven. Professor Heilprin,[1] in discussing the phenomena in his treatise on the Explorations on the West Coast of Florida, attributes the change to an infiltration of silica in a heated condition, but adds that he can not even hazard a guess, much less explain in what precise manner the peculiar method of hollowing was brought about. Especially is this true of the colonial types with botryoidal-shaped cavities. Furthermore, in the genera possessed of very small calices, as in *Porites* and *Stylophora*, their delicate structure is often so destroyed as to render a specific diagnosis impossible.

The writer has also been at a great disadvantage from the fact that a number of the species have been described from single specimens, and until further collecting is done in the field it will be impossible to give a more detailed specific description of these forms.

The fauna under discussion embraces in its geological distribution, the Neocene and Oligocene epochs. On the other hand, geographically the range of these forms is remarkably confined. With the single exception of a few casts from the Miocene of Griswoldville, Fresno County, California, we find them limited to the Atlantic seaboard States, from New Jersey to Florida, inclusive.

In considering this fauna as a unit, its most striking feature is the great number and variety of the genera represented as compared with the species, there being twenty-eight of the former to thirty-five of the latter. This proportion of genera to species is quite unusual, the number of species in any given fauna more often being far in excess of the genera. As an instance, we may cite the present fauna of Bermuda, with its twenty-eight species to only ten genera, or the results reported by the *Challenger*, which during its entire cruise obtained only sixty-nine genera of reef corals to two hundred and ninety-three species, and many of these presenting considerable variation. We find, further, in taking account of the Neocene corals, that the colonial far outnumbers the individual type.

In examining the bathymetric distribution of the species, it is doubt-

[1] Trans. Wagner Free Inst. Sci., I, p. 62.

ful whether any truly deep-sea forms are represented. The few genera that might be so classed are also frequently found living in shallow depths. When we add to the above the fact that they occur in the deposits side by side with true reef builders, we may consider that the corals living in the Oligocene and Pliocene periods flourished as shallow-water forms with preponderating reef-building tendencies.

Both from their kind and the relations which the coral genera and species of a particular area bear to one another, it is possible to judge of the similarity or of the variation of the physical conditions prevailing in the region.

Regarding this hypothesis, Prof. P. M. Duncan,[1] in his first article on the West Indian fossil corals, says:

> The range, in strata, of the genera of corals is often so great, and the species of remote formations are so frequently closely allied, that the *Zoantharia* form better guides for estimating the external physical circumstances of the regions in which they existed than for determining the age of the strata. There are few subjects better understood than the relation between the presence of certain genera and species of coral and certain definite, external physical conditions. Depth of sea, purity of sea water, its intense aeration, force of wave, absence of fresh water, the climate and nature of the coast line, with all their possible varieties, appear to determine, according to their mutual reactions, the presence and persistence of species and genera. Indeed, very slight variations from the general rule of the external circumstances in a coral sea would appear to prevent the development of certain genera. It is a reasonable induction that, if a species be found in strata of any age and distant in space, the two sets of strata were formed under the same external physical circumstances.

If this be true, then the conditions prevailing upon the Atlantic coast during Neocene time were most varied, both from a geological and a geographical standpoint; for we find that in the fauna under discussion the genera of the corals are quite varied, and that the individual species are very limited, both vertically and horizontally, in their stratigraphic distribution. In this distribution the Pliocene species are perhaps more liable to be limited in their geographical range than in their geological, since a number of the forms are either found as recent or having closely related living allies, whereas the Miocene species appear to be about equally confined both from a geographical and a geological aspect.

A majority of the corals represented belong to extinct species. A few are now found living in the Caribbean Sea, and some belong to closely allied fossil forms from Santo Domingo and other West Indian islands.

We should expect that the Neocene corals of the United States would have close kinship with those of like age in the West Indies, but such does not seem to be generally the case. On the other hand, according to Professor Duncan the fossil Oligocene corals of the West Indies are closely related to those of the Miocene of Europe and the recent faunas of the Pacific and Indian oceans. Regarding the affinities of the Neo-

[1] Quart. Jour Geol. Soc., XIX, p. 453.

cene fauna of the United States as a whole, we come to the conclusion that it has more of a likeness to that at present living in the Caribbean Sea and Atlantic Ocean than to the fauna, recent or fossil, of any other region.

The descriptions of families and genera will not be repeated in the present work, as they are to be found in the paper of Prof. P. Martin Duncan on "A Revision of the Families and Genera of the Scleroder mic Zoantharia, Edwards and Haime, or Madreporaria (*M. rugosa* excepted)," which also contains the system of classification employed in the present memoir.

The author wishes to express his thanks, through Mr. William H. Dall and Mr. Joseph Willcox, to the Wagner Free Institute of Science for the loan of many of the specimens herein described; also to Mr. T. Wayland Vaughan for much kindly assistance and advice. Mr. Vaughan has looked over the paper after it was written and has attended to having the figures drawn.

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Class ANTHOZOA.

Suborder ZOANTHARIA SCLERODERMATA (or MADREPORARIA).

Section MADREPORARIA APOROSA.

Family TURBINOLIDÆ (part) Edwards and Haime.

Genus DESMOPHYLLUM Ehrenberg.

DESMOPHYLLUM WILLCOXI Gane.

(Plate XV, figs. 1–3.)

1895. *Desmophyllum willcoxi* GANE, Johns Hopkins Univ. Circ., XV, No. 12, October, 1895, p. 9.

Corallum quite variable in shape, more or less compressed, conical, attached at base by a moderately long pedicle, which may be either broad or narrow. Surface of the wall and costal ridges smooth, at times showing the development of an epitheca. Costæ well developed, corresponding to all septa, more prominent near the calicular margin, margins not acute, some granulations over the surface. The summits of the calice in the shorter diameter are higher than in the longer. The margin of the calice is irregularly dentate. The interior of the wall coarsely pitted here and there between the septa. There are six systems of septa with four well-developed cycles, and a fifth rudimentary. The septa are exsert, rather stout, thicker near the wall and in the vicinity of the base of the calicular fossa; they are generally straight but often curved, with granulated sides, and the surface often shows quite distinct striations. In well-preserved specimens the fossa is deep and narrow, and the free margins of the septa at the base of the fossa often form by means of small rod-like projections a sort of columella as in Flabellum.

Such a pseudocolumella similar to that found in the present species is described by Mr. H. N. Mosely[1] in his report on the "Deep Sea Madreporaria" as occurring in the *Desmophyllum ingens* from the fjords of western Patagonia.

This species is respectfully dedicated to Mr. Joseph Willcox, of Philadelphia.

Dimensions.—The dimensions of the largest specimen are: Height, 28 mm.; greatest length and least width of calice, respectively, 32 and 25 mm. The calices of the majority of the specimens are, however, more compressed than in this one.

Geological horizon.—Upper Oligocene.

Locality.—Ballast Point, Tampa Bay, Florida.

Collections.—Wagner Free Institute of Science, and in the private cabinet of Mr. Joseph Willcox, of Philadelphia.

[1] *Challenger* Expedition, Zoology, II, Pt. 7. Report on certain Hydroid, Alcyonarian, and Madreporarian corals procured during the voyage of H. M. S. *Challenger*, in the years 1873–1876, p. 161.

Genus PARACYATHUS Edwards and Haime.

PARACYATHUS VAUGHANI Gane.

(Plate XV, figs. 4–6.)

1895. *Paracyathus vaughani* GANE, Johns Hopkins Univ. Circ., XV, No. 121, October, 1895, p. 9.

Corallum small, broad and low, with the calice about the same diameter as the base, above which the wall is somewhat constricted. Wall thin, costulate to its base. Costæ low, unequal, finely granular, more prominent near the calicular margin where they are considerably thicker than their corresponding septa. Calice circular in the young, slightly oval in the adult individual; fossa broad, moderately deep. Septa in six systems of five cycles lacking part of the sixth order of the last cycle; in forms of medium size, only four cycles are present. Primaries and secondaries subequal, thick and stout, with summits more broadly rounded and more strongly exsert than those of the remaining thin and slender septa; sides coarsely granulated, edges of the higher cycles regularly crenately dentate. Pali granular, present before all the septa but those of the last cycle, excepting in the most mature forms, where they may be lacking before a part of the fourth as well as before all of the fifth cycle of septa. Columella papillose, well developed.

In polishing down the base of the coral, the rings marking the existence of previous outer walls are clearly seen. In one specimen no less than eight appear, showing the growth of the coral and its relation to the development of its septa.

The individuals of this form generally occur alone attached to some shell, but occasionally they are found in clusters, being in close contact with one another at their sides or the outer edge of their bases.

Dimensions.—Height of largest specimen, 4 mm.; breadth of calice, 11 mm.

Geological horizon—Miocene, Chesapeake formation.

Locality.—Carters Landing, James River, and Yorktown, Virginia.

Collections.—U. S. National Museum (type); Wagner Free Institute of Science; Johns Hopkins University.

Family OCULINIDÆ (part) Edwards and Haime.

Genus ASTROHELIA Edwards and Haime.

ASTROHELIA PALMATA (Goldfuss).

1826–1833. *Madrepora palmata* GOLDFUSS, Petrefacta Germaniæ, Pt. 1, p. 23, pl. XXX, figs. 6, *a*, *b*.

1834. *Oculina palmata* EHRENBERG, Abhand. Berlin, Ak. Wiss. for 1832, pp. 305, 344.

1834. *Madrepora palmata* BLAINVILLE, Man. Act. ou Zooph., p. 390.

1836. *Madrepora palmata* LAMARCK, Hist. Nat. Animaux sans Vert., 2d ed., II, p. 450.

1848. *Oculina palmata* BRONN, Index Palæontologicus, I, p. 835.

1849. *Astrhelia palmata* EDWARDS and HAIME, Compte Rendus Ac. Sci., XXIX, p. 68.

1850. *Astrhelia palmata* EDWARDS and HAIME, British Fossil Corals, Introd., p. 20.
1850. *Astrhelia palmata* EDWARDS and HAIME, Ann. des Nat., 3d ser., XIIII, p. 74.
1851. *Astrhelia palmata* EDWARDS and HAIME, Archiv. Mus. Hist. Nat. Paris, V, p. 37.
1853–1856. *Astrhelia palmata* BRONN, Lethæa Geognostica, Pt. 6, p. 307.
1857. *Astrohelia palmata* EDWARDS and HAIME, Hist. Nat. des Corall., II, p. 111.
1864. *Astrohelia palmata* MEEK, Check-list Invert. Foss. N. Am. Miocene, p. 1.
1895. *Astrohelia palmata* GANE, Johns Hopkins Univ. Circ., XV, No. 121, p. 9.

Colony forming a palmate mass with more or less coalescing branches. In specimens which are not water worn the costæ are quite distinct at the calicular edge and bent, passing at times into slight flattened ridges on the surface of the coenenchyma. Calices slightly unequal and separated by irregular distances from one another, moderately deep, and projecting somewhat above the coenenchyma. Septa in two cycles of about equal size, with a third cycle, generally rudimentary, at times, however, fully developed; narrow, coarsely toothed with granular sides. The septa often unite in the center forming a small somewhat spongy columella.

This coral is of interest as being the first described from the Neocene of this country.

Dimensions.—Breadth of calice from 2 to 3 mm.

Geological horizon.—Miocene, Chesapeake formation.

Locality.—Shiloh, New Jersey, and common at many localities in Maryland.

Collections.—U. S. National Museum; Philadelphia Academy of Natural Sciences; Wagner Free Institute of Science; Johns Hopkins University.

Family ASTRÆIDÆ Edwards and Haime, amended.

Genus CIRCOPHYLLIA Edwards and Haime.

Subgenus ANTILLIA Duncan.

ANTILLIA GUESDESI (Duchassaing and Michelotti).

1850. *Turbinolia biloba* DUCHASSAING, Anim. Rad. des Antilles, p. 14 (not Michelin).
1854. (?) *Circophyllia*, species 3, LONSDALE, manuscript.
1861. *Montlivaultia guesdesii* DUCHASSAING and MICHELOTTI, Mem. Acad. Sci. Torino, XIX, p. 345, pl. v, fig. 13.
1864. *Antillia bilobata* DUNCAN, Quart. Jour. Geol. Soc., XX, p. 31, pl. III, fig. 3.
1866. *Antillia guesdesii* DUCHASSAING and MICHELOTTI, Mem. Acad. Sci. Torino, XXIII, p. 172.
1868. *Antillia bilobata* DUNCAN, Quart. Jour. Geol. Soc., XXIV, p. 23.
1870. *Antillia guesdesii* DUCHASSAING, Revue des Zooph. et des Spong. des Antilles, p. 29.
1875. *Antillia bilobata* POURTALÈS, Geol. Mag., new ser., 2d Dec., II.
1895. *Antillia biloba* GANE, Johns Hopkins Univ. Circ., XV, No. 121, p. 9.

Corallum simple, nearly straight, conical, at times constricted vertically so as to appear more or less bilobate, pedicellate. Epitheca well developed and membraniform. Costæ large above, projecting outward 2.5 mm. from the calicular margins; edges rounded and marked by tubercles; sides granulated at their upper extremites in radiating rows extending over from the septa. Exotheca frequently present between

the costæ, inclined, and forming cells. In the largest specimens the calicular area is somewhat less than that of a transverse section of the coral about 15 mm. below the margins. Calice variable in shape from quite oval to compressed, sometimes constricted centrally, approximating in shape the figure eight; it is shallow and presents a wavy margin on a nearly even plane in the adult, uneven in the young. The fossa is deep and narrow. There are six systems with five complete cycles of septa, and in the adult individuals sometimes several orders of a sixth. The septa are crowded, often curved, a little thicker at the wall than elsewhere, marked on their upper edges with a very slight serration of small papillæ; the sides have radiating rows of granules which merge with those on the costæ; this regularity of granular arrangement is not so marked in the vicinity of the lower part of the fossa. Columella long, dense, and spongy. Endotheca abundant.

When comparing the coral at different stages in its growth, this species is very variable in shape. In the young forms, we find the corallum more conical than turbinate, more strongly attached, and its calice much more oval and not at all resembling the figure eight in outline. The margin of the calice is more sinuous, with the longer axis more depressed than the shorter. Epitheca less prominent. Septa in only four cycles, straighter and less crowded. Fossa deeper than in the adult form.

The number of specimens examined by the writer is numerous, representing quite a series of individuals of most varied size and shape. Had either of several extreme types occurred alone without the connecting forms it might well be considered as a distinct species.

The young are but slightly, if at all, bilobed, the most matured individuals alone being turbinate and vertically constricted with a figure eight shaped calice, the latter characteristics being described by Professor Duncan as typical of the West Indian forms.

Dimensions.—The dimensions of the largest specimens are: Height, 50 mm.; greatest length and least width of calice, respectively, 59 and 25 mm. When comparing the above measurements with those of the largest specimens from Santo Domingo, the latter are found to be far larger in size than the forms occurring in Florida.

Geological horizon.—Upper Oligocene, Chipola formation.

Locality.—Bailey's Ferry, Chipola River, Calhoun County, Florida; Santo Domingo, Guadeloupe (horizon not given), West Indies.

Collection.—U. S. National Museum.

Genus ASTRANGIA Edwards and Haime.

ASTRANGIA LINEATA (Conrad).

1835. *Lithodendron lineatus* CONRAD, Trans. Geol. Soc. Pa., I, Pt. 2, p. 340, pl. XIII, fig. 4.

1845. *Anthophyllum lineatum* LYELL, Quart. Jour. Geol. Soc., I, p. 424.

1845. *Anthophyllum lineatum* LONSDALE, Quart. Jour. Geol. Soc., I, p. 495, fig. *a*.

1845. *Caryophyllia lineata* CONRAD (Manuscript label), Quart. Jour. Geol. Soc., I, p. 495.

1846. *Lithodendrum lineatum* CONRAD, Am. Jour. Sci., 2d ser., I, p. 220.
1848. *Anthophyllum lineatum* BRONN, Index Palæontologicus, I, p. 83.
1864. *Cladocora? lineata* MEEK, Check-list Invert. Foss. N. Am. Miocene, p. I.
1895. *Astrangia lineata* GANE, Johns Hopkins Univ. Circ., XV, No. 121, p. 9.

Colony encrusting, consisting of conical or cylindrical corallites, the largest sometimes rising a centimeter above the surface of the basal expansion. Individual corallites divergent, but usually touching at their bases. Walls very thin at their calicular edge, thicker below. Epitheca extremely thin, finely granulated and in some forms showing parallel, somewhat sinuous, flat and broad striæ extending to the base. True costæ of unequal size are at times present in the vicinity of the calicular edge. Calice as a rule circular, at times considerably compressed, deep. Septa much narrowed at the top, in mature forms in four complete cycles; septa of the last cycle much thinner and narrower than those of the preceding, often merely rudimentary; in the younger individuals septa but thirty-six; there is a tendency for the younger septa to turn toward and unite with the older; inner edges strongly dentate, teeth slightly coarser near the columella; sides granulated, though not stoutly so. Columella small and formed of a net-work of trabiculæ with additions from the septal ends. Multiplication by budding chiefly from basal expansions, although it may take place well up on the side of a parent corallite.

The writer refers this species to the genus *Astrangia*, although there is more of an epitheca present than has been hitherto considered as characteristic of the genus. In all other respects this species seems to be typical. Lonsdale, in his description of the coral, states that it closely resembles the *Lithodendron flexuosum* described by Michelin in his Iconographie Zoolphytogique, from the faluns of Touraine, but Edwards and Haime have since pronounced the species of Michelin to be a *Cladocora*. As this American species lacks pali and possesses neither a shallow calice nor septa quite exsert, it can not belong to the genus *Cladocora*.

Dimensions.—Breadth of calice, from 4 to 8 mm.

Geological horizon.—Miocene, Chesapeake formation.

Locality.—Bellefield, Yorktown, Carters Landing, and City Point, Virginia.

Collections.—U. S. National Museum; Philadelphia Academy of Natural Sciences; Wagner Free Institute of Science; Johns Hopkins University.

ASTRANGIA ASTRÆIFORMIS Edwards and Haime.

1850. *Astrangia astræiformis* EDWARDS and HAIME, Ann. des Sc. Nat., 3d ser., XII, p. 181.
1857. *Astrangia astræiformis* EDWARDS and HAIME, Hist. Nat. des Coralliaries, II, p. 614.
1863. *Astrangia astræiformis* VERRILL, Mem. Boston, Soc. Nat. Hist., I, p. 39.
1871. *Astrangia astræiformis* POURTALÈS, Ill. Cat. Mus. Comp. Zool. Harvard Coll., No. IV, p. 80.
1895. *Astrangia astræiformis* GANE, Johns Hopkins Univ. Circ., XV, No. 121, p. 9.

Colony encrusting, of closely united corallites often free at their summit. Walls minutely granulated on the exterior surface. Costæ present, most distinct near the calicular edge. Calices open, deep and circular except when crowded. Septa very slightly exsert, narrowed at top, in six systems of three complete cycles with part of a fourth; those of the third cycle a little narrower than the preceding, uniting with them inferiorly and near the columella; edges sharply and somewhat coarsely dentate; sides granulated. Columella well developed, papillary, the outer part resembling the inner teeth of the septa. Gemmation both from marginal buds on the basal expansion and from the sides of the coral between the parent corallites.

This species is found recent on the shores of the Atlantic from North Carolina to Florida. It is very nearly related to *Astrangia danæ* Agassiz, occurring on the coast of this country from New Jersey to Massachusetts. It also in many respects resembles the fossil *Astrangia lineata* from the Virginia Miocene.

Dimensions.—Breadth of calice, from 2 to 4 mm.

Geological horizon.—Miocene.

Locality.—Cain Hoy, South Carolina.

Collections.—U. S. National Museum.

Genus ASTRANGIA Edwards and Haime.

Subgenus COENANGIA Verrill.

CŒNANGIA BELLA (Conrad).

1841. *Astræ bella* CONRAD, Proc. Ac. Nat. Sci. Phila., I, p. 33.
1842. *Astræ bella* CONRAD, Jour. Ac. Nat. Sci. Phila., VIII, Pt. 2, p. 189.
1857. *Astrangia? bella* EDWARDS and HAIME, Hist. Nat. des Corall., II, p. 615.
1857. *Astræa bella* TUOMEY and HOLMES, Pleiocene Foss. South Carolina, p. 1, pl. 1, figs. 1, 1*a*.
1860. *Astræa bella* HOLMES, Pleiocene Foss. South Carolina, p. 1, pl. 1, fig. 2.
1861. *Astrangia? bella* DE FROMENTEL, Introduct. Polyp. Foss., p. 237.
1864. *Astræa bella* MEEK, Check-list Invert. Foss. N. Am. Miocene, p. 1.
1868. *Astrangia* (*Cœnangia*) *bella* VERRILL, Trans. Conn. Ac. Art. Sci., I, Pt. 2, p. 530.
1895. *Cœnangia bella* GANE, Johns Hopkins Univ. Circ., XV, No. 121, p. 9.

Colony incrusting, rising at times into lobate extensions. Corallites thin walled, closely united. Calices irregularly prismatic, quite deep, with their fossæ narrow at the bottom. Septa in three complete cycles, the third less stout and usually curved toward and united, near the columella, to those of the preceding cycle; occasionally part of a fourth cycle is developed. Septa thin, with free edges sharply and roughly denticulated throughout; sides somewhat coarsely granulated, frequently the granules being also present on the inside wall of the calice. Columella moderately developed, spongy, composed of contorted processes originating from the inner margins of the septa. Gemmation takes place in the interspaces between the corallites.

This species is closely related to the living *Cœnangia conferta* of the Pacific, and *Astrangia danæ* Agassiz and *Astrangia astræiformis* of the Atlantic.

Dimensions.—Breadth of calice, from 3 to 6 mm.

Geological horizon.—Miocene, Chesapeake formation; and (Pleiocene? of Tuomey and Holmes).

Locality.—Darlington, South Carolina; Newbern, North Carolina; Prince George County, Virginia.

Collections.—U. S. National Museum.

CŒNANGIA MARYLANDICA (Conrad).

1841. *Astræa marylandica* CONRAD, Proc. Ac. Nat. Sci. Phila., I, p. 33.
1842. *Astræa marylandica* CONRAD, Jour. Ac. Nat. Sci. Phila., VIII, Pt. 2, p. 189.
1845. *Astræa hirtolamellata?* LYELL, Quart. Jour. Geol. Soc., I, p. 424.
1845. *Astræa hirtolamellata* LONSDALE, Quart. Jour. Geol. Soc., I, p. 500, fig. 1.
1846. *Astræa marylandica* CONRAD, Am. Jour. Sci., 2d ser., I, p. 220.
1846. *Astroitis or Pleiadia marylandica* DANA, Am. Jour. Sci., 2d ser., I, p. 221.
1847. *Astræa marylandica* LONSDALE, Am. Jour. Sci., 2d ser., IV, p. 359.
1847. (Allied to Caryophyllia family) DANA, Am. Jour. Sci., 2d ser., IV, p. 361.
1848. *Astræa marylandica* TUOMEY, Report Geol. South Carolina, pp. 182, 208.
1848. *Dipsastræa hirtolamellata* BRONN, Index Palæontologicus, I, p. 126.
1857. *Astræa marylandica* TUOMEY and HOLMES, Pleiocene Foss. South Carolina, p. 2, pl. 1, figs. 2, 2*a*.
1857. *Astrangia? marylandica* EDWARDS and HAIME, Hist. Nat. des Corall., II, p. 615.
1864. *Astræa marylandica* MEEK, Check-list Invert. Foss. N. Am. Miocene, p. 1.
1868. *Astrangia* (*Cœnangia*) *marylandica* VERRILL, Trans. Conn. Ac. Art. Sci., I, Pt. 2, p. 550.
1895. *Cœnangia marylandica* GANE, Johns Hopkins Univ. Circ., XV, No. 121, p. 9.

Colony incrusting, at times rising into lobes in the middle. Corallites in close contact but the individual walls distinct. Calices crowded, irregular in size and shape, oval, circular, and polygonal, the latter predominating, moderately deep, with perpendicular walls. Interseptal chambers very wide. Septa subequal in two cycles, thin, the free edge subentire and concave; uniting at their inner margins to form a pseudocolumella. Walls and septa of the calices completely covered with minute tubercles. Dissepiments scarce. Growth of corallum by budding of young corallites from between the angles of the older cells.

This species is common in the Miocene bluffs of the James River, Virginia, where it is generally found incrusting the surface of the *Pecten jeffersonius*.

In the opinion of the writer this apparently distantly related coral will, upon further study, prove to have close affinities with the *Septastræa sexradiata* of Lonsdale.

The nearest living ally to this form, according to Professor Verrill, is the *Cœnangia conferta* of the Pacific Ocean. The latter, however, differs from the fossil coral in possessing usually 24 septa and only moderately wide interseptal chambers; the walls are thinner; the septa have larger lateral granules, and the columella is more strongly developed. Professor Verrill further adds[1] "that the close relation of this living (Pacific Ocean) species to the fossil and recent species (*Astrangia danæ* and *Astrangia astræiformis*) of the temperate coasts on the Atlantic

[1] Notes on Radiata, Trans. Conn. Acad. Arts and Sci., I, Pt. 2, p. 531.

side, together with the occurrence of certain shells that are apparently identical in the two regions, but found neither in the arctic nor in the tropical regions, is very suggestive of a former connection, perhaps in early tertiary times, between the two oceans, through the temperate parts of North America."

Dimensions.—Breadth of calice, from 2 to 4 mm.

Geological horizon.—Miocene, Chesapeake formation and (Pleiocene ? of Tuomey and Holmes).

Locality.—Virginia and South Carolina.

Collections.—U. S. National Museum; Philadelphia Academy of Natural Sciences; Wagner Free Institute of Science; Johns Hopkins University.

Subgenus **PHYLLANGIA** Edwards and Haime.

PHYLLANGIA FLORIDANA Gane.

(Plate XV, figs. 7–9.)

1895. *Phyllangia floridana* GANE, Johns Hopkins Univ. Circ., XV, No. 121, p. 9.

Colony encrusting, consisting of subturbinate corallites arising from the basal expansion. Individuals generally free above but somewhat closely united at their base. Walls thin at the calicular edge, thicker below. Costæ low, subequal, minutely granulated, reaching to the base, but more prominent at the calicular margin and at the swellings just beneath the constrictions in the walls of the corallites. About on a level with the bottom of the fossa, the diameter of the corallite is least, the walls being here somewhat constricted, beneath which constriction they are again frequently swelled to a diameter equal to that at the calicular margin. Calices somewhat expanded, widely open, deep, narrow at the bottom. Septa crowded, in six systems of four complete cycles, lacking a few septa of the fifth order; primaries and secondaries more exsert, thicker and broader than the septa of the following cycles, quarternaries least exsert, thinnest and narrowest; sides of the septa sharply granulated and the edges of all but the fourth cycle rounded superiorly and subentire in their upper parts, the lower two-thirds of the septal edges being strongly lobate or dentate, the uppermost tooth being the most prominent and similar in shape to a true paliform lobe. Columella papillary occupying a very limited area; the line of separation between the papillæ of the columella and the lowest teeth of the septa being indistinguishable. Gemmation by budding from the basal expansion of the wall of a parent corallite.

This form in its general size and mode of growth very much resembles the *Astrangia lineata* (Conrad) of the Virginia Miocene deposits.

Dimensions.—Breadth of calice, from 4 to 6 mm.

Geological horizon.—Pliocene, Caloosahatchie beds.

Locality.—Alligator Creek, Monroe County, Florida.

Collections.— U. S. National Museum. The type specimen was collected by Mr. Joseph Willcox, of Philadelphia.

Genus CLADOCORA Edwards and Haime.

CLADOCORA JOHNSONI Gane.

(Plate XV, figs. 10–12.)

1895. *Cladocora johnsoni* GANE, Johns Hopkins Univ. Circ., XV, No. 121, p. 10.

Corallites slender, somewhat flexuous, and cylindrical. When found fossil they are detached from the parent colony. Walls of moderate thickness. Costæ granular, well developed, and close set; those corresponding in position to the septa of the first and second cycles of the same size, and larger than those corresponding the members of the third and fourth cycles. With the exception of a few costæ of the fourth cycle, all reach to the base of the corallite. Calices circular *with a shallow fossa*. There are six systems of three complete cycles, with occasionally a few rudimentary septa of an incompleted order of a fourth cycle. Septa exsert, the primaries more prominently so, rounded and very finely granulated laterally, giving the laminæ a slightly striated appearance; primaries thicker and broader than secondaries, which, in turn, have a similar relation to the tertiaries. In sections of a corallite below the calice, the septa of the third cycle approach and midway between the theca and columella unite with those of the preceding cycle. Either true pali or paliform lobes are present before all but the last cycle of septa. Columella coarsely papillary but rather narrow. Gemmation lateral and often in pairs at the same height on the stem.

The nearest related form to this Pliocene coral seems to be the *Cladocora debilis* Edwards and Haime, recent at Maderia, but owing to its meager descriptions the writer can not speak definitely on this point, as he has not had an opportunity of examining specimens of the species.

The present form is named after Mr. Charles W. Johnson, of Philadelphia, who has added so much to our knowledge of the Neocene paleontology of the South.

Dimensions.—Height of the largest specimen, 12 mm.; breadth of calice, from 2 to 2.8.

Geological horizon.—Pliocene.

Locality.—Waccamaw River, South Carolina.

Collections.—Wagner Free Institute of Science (type), Johns Hopkins University. The type specimens were collected by Mr. C. W. Johnson.

Genus MANICINA Ehrenberg.

MANICINA PLIOCENICA Gane.

1895. *Manicina pliocenica* GANE, Johns Hopkins Univ. Circ., XV, No. 121, p. 10.

Colony very variable in shape, with a sinuous outline, from compressed conical to subhemispherical; attached by a slender pedicle, the lower part of the base curved in the direction of the greater axis of the

colony. Valleys rather wide, long and deep, having perfect communication between them. Corallines broad and furrowed. Wall thin. Epitheca well developed, pellicular; its lines of growth in wavy ridges of varied thickness, the thinnest of which are pierced by the granules of the costæ; in some cases it is limited to the lower part of the base, in others it reaches to the summit of the outer wall of the colony. Costæ of nearly equal size, the oldest only reaching the pedicle; considerably exsert, being a continuation of the septa at their upper edges; finely toothed on the free edge, rows of granules on the sides. Exotheca abundant. Septa quite exsert, slightly thicker at the wall, granulated laterally in radiating rows, with free edge regularly toothed, the teeth being somewhat larger near the paliform lobe, which is somewhat thicker, at least near the columella, than the principal septum to which it belongs. Columella well developed, narrow, of a coarse spongy nature, especially when seen in vertical section. Endotheca abundant, with dissepiments of unequal length inclined toward the inner and lower edges of the septa.

Pourtalès[1] considered that all the living West Indian types of this genus represented one species, the *Manicina areolata* (Linnæus). Whether this be true or not, the species under discussion differs from all recorded living forms. More especially it varies from *Manicina areolata* in the following particulars: Its collines are generally broader; the septo-costæ of adjoining individuals are rarely united, the walls of the individuals being distinct; septa somewhat stouter and less crowded together, in very rare cases only exceeding eleven in number to the centimeter; the teeth on the inner edge of the septa are more regular in size and shape. On the other hand, in *Manicina areolata* the collines are narrow, with many of the septo-costæ of neighboring individuals united. The septa are thinner and more crowded, from fifteen to twenty (Quelch) to the centimeter. The teeth on the inner edge vary more in different parts of the same septum. This differentiation of the teeth on different parts of the edge of the septum and paliform lobe, as shown by the living types, is well illustrated in the "Report on the Florida Reefs" by Agassiz.[2]

Dimensions.—This species is very variable in size and shape. The greatest width of one corallum measured is 100 mm.; length, 150 mm. (estimated); height, 80 mm.; of another, width, 55 mm.; length, 135 mm.; height, 55 mm.

Geological horizon.—Pliocene.

Locality.—Caloosahatchie River, Florida.

Collections.—U. S. National Museum (type), collected by Mr. W. H. Dall; Wagner Free Institute of Science, collected by Messrs. Heilprin and Willcox.

[1] Ill. Cat. Mus. Comp. Zool., Harvard Coll., No. IV, pp. 72, 73.
Memoir Mus. Comp. Zool., Harvard Coll., VII, No. 1, pl. VI, fig. 6.

Genus SEPTASTRÆA d'Orbigny (1849), emend. Hinde.

SEPTASTRÆA SEXRADIATA (Lonsdale).

1837. *Astrea* sp. W. B. and H. D. Rogers, Trans. Am. Phila. Soc., new ser., V, p. 338.
1845. *Columnaria ? sexradiata* Lonsdale, Quart. Jour. Geol. Soc., I, p. 497, figs. *a, b*.
1845. *Columnaria ? sexradiata* Lyell, Quart. Jour. Geol. Soc., I, p. 416.
1846. *Astroitis sexradiata* Dana, Am. Jour. Sci., 2d ser., I, p. 221.
1846. *Astroitis sexradiata* Dana, U. S. Exploring Expedition, Zoophytes, p. 722.
1848. *Columnaria ? sexradiata* Bronn, Index Palæontologicus, I, p. 321.
1849. *Septastræa forbesi* Edwards and Haime, Ann. des Sci. Nat., 3d ser., XII, p. 64.
1849. *Septastræa subramosa* d'Orbigny (nominal), Note sur les Polyp. foss., p. 9.
1852. *Septastræa subramosa* d'Orbigny, Prodr. de Pal., III, p. 146.
1857. *Septastræa forbesi* Edwards and Haime, Hist. Nat. des Corall., II, p. 450.
1857. *Astrangia ? bella* Edwards and Haime, Hist. Nat. des Corall., II, p. 615.
1861. *Astrangia ? bella* de Fromentel, Introduction Polyp. foss., p. 237.
1861. *Septastræa forbesi* de Fromentel, Introduction Polyp. foss., p. 174.
1851. *Septastræa forbesi* Edwards and Haime, Archiv. Mus. Nat. Hist., V, p. 115.
1864. *Septastræa ? sexradiata* Meek, Check-list Invert. Foss., N. Am. Miocene, p. 1.
1864. *Septastræa forbesi* Meek, Check-list Invert Foss. N. Am. Miocene, p. 1.
1884. *Astrea* sp. W. B. and H. D. Rogers, Reprint of Ann. Reports and other Papers on Geology of the Virginias, p. 667.
1886. *Glyphastræa forbesi* Duncan, Abstract. Proc. Geol. Soc. London, No. 495, p. 18.
1887. *Glyphastræa sexradiata* Duncan, Quart. Jour. Geol. Soc., XLIII, p. 30.
1887. *Glyphastræa forbesi* Duncan, Quart. Jour. Geol. Soc., XLIII, p. 29, pl. III.
1888. *Septastræa sexradiata* Hinde, Quart. Jour. Geol. Soc., XLIV, p. 219, pl. IX, figs. 6–16.
1888. *Septastræa forbesi* Hinde, Quart. Jour. Geol. Soc., XLIV, p. 218, pl. IX, figs. 1–5, 7–15, 17.
1895. *Septastræa sexradiata* Gane, Johns Hopkins Univ. Circ., XV, No. 121, p. 10.

Colony incrusting at base, rising into cylindrical compressed stems with short, rounded branches or of large flattened masses with lobate and digitiform expansions. Corallites with walls in close contact but distinct one from another, subcylindrical in the interior, although prismatic at the surface of the corallum. The matured calices are shallow with thickened margins, an impressed line generally marking the division between the individuals; the floors of the calices, which have a dome-shaped elevation in the center, are entirely closed with stereoplasm, the upper edges of the septa alone slightly projecting. When the calices are immature or much crowded the walls are thin and the floor near its periphery is incomplete. The entire calice when perfectly preserved is covered with minute tubercles, although the surface of the septa in the interior of the corallites is smooth. Septa usually 12 in the lower portion of the corallite; in the calice a rudimentary third cycle is often added. Abnormally the calice may possess from 0 to 36 septa. The inner septal ends are often intertwisted to form a pseudocolumella. Dissepiments very thin, irregularly developed, frequently at the same level in the different interseptal loculi, usually from 1 to 2 mm. apart, the uppermost dissepiment of the corallite forming the base to the infilling stereoplasm. Increase by gemmation from buds formed at the interspaces between the walls of adjacent mature corallites.

For a further detailed and most elaborate description of this coral consult the paper by Dr. G. J. Hinde on the genus *Septastræa* in general, and the present species in particular. Nothing but the mode of attachment is now added to the characteristics of the form as so clearly determined by Dr. Hinde.

The present writer, however, considers the *Septastræa forbesi* Edwards and Haime, as a synonym of the *S. sexradiata* Lonsdale. In discussing the similiarity of the two species Dr. Hinde[1] aptly summarizes the subject in the following words. He says that—

> It is very evident that in form, mode of growth, and in every other feature but one, this species (*S. sexradiata*) is closely similar to *Septastræa forbesi*. The one feature in which it differs is the greater development of the third cycle of septa within the calices. This feature, curiously enough, is limited to the calices, for in the lower part of the corallites only the 12 septa of the first and second cycles are developed, as in *S. forbesi*, so that specimens in which the surface features are partially obliterated can not be distinguished from this latter species. I have serious doubts whether this one feature may not, after all, be due to a more favorable condition of growth or environment to which this particular specimen has been exposed. It is somewhat remarkable that of the thirteen specimens of *Septastræa* which have come under my notice this is the only one which exhibits such a development of the third cycle of septa in the calices; in all others this cycle is only indicated by marginal ridges. There is a considerable amount of variation in this respect in the specimens referred to *Septastræa forbesi*, for in some only 6 septa are developed in the calices, in others 12, and yet no specific distinction can be made, since in certain specimens both conditions are present. It might therefore be urged that, as Lonsdale's specimen is undistinguishable in every other respect from *Septastræa forbesi*, the difference in this variable feature does not possess specific value. While admitting the force of the argument, I think it is preferable provisionally to allow the difference to be specific, and if further evidence should show that it must be regarded as merely due to external conditions, and that there is only one species, then this species must bear Lonsdale's name of *sexradiata*, since this has the priority of Edwards and Haime's name, *forbesi*.

As the form under discussion is the most common coral occurring in the beds of the Virginia Miocene, the writer has had an opportunity of studying a large series of specimens, and has reached the conclusion as stated above that all belong to the same species, although in the superficial calices there is often a remarkable divergence in the relative development of the septa and the pseudocolumella. Were the *Septastræa forbesi* allowed of specific value, then a number of new specific names should be employed for these forms with calices, either containing but 6 or less septa, or with the septa of the latter cycles united with those of the preceding, or with the other similar modifications in the calice.

That both Mr. Lonsdale and Sir Charles Lyell considered these *Septastræa* as of one species, the *S. sexradiata* is evinced by the fact that the former, who described the forms, gave but one specific name to them, and the latter, who collected the specimens, stated[2] that lying on the beach of the James River were masses of the *S. sexradiata* upward of

[1] Quart. Journ. Geol. Soc., XLIV, p. 220.
[2] Idem., I, 1845 p. 416.

2 feet in width, which had been washed out of the shell marl. The above would show that both Lonsdale and Lyell regarded the coral described as representing the specimens collected rather than of a peculiar variety as has been since considered by later writers, with the possible exception of Dr. Hinde, who desired further information on the subject before finally committing himself.

The first reference to this coral is found in 1837 as a footnote to an article[1] on the geology of the Tertiary formations of Virginia by W. B. and H. D. Rogers. They remark that an *Astrea* of immense magnitude was lying at that time half buried in sand on the beach of Tarbay, James River, having fallen to its present position from an overhanging cliff. They add further that it was much reduced in size since its fall, but had then an approximate weight of 700 pounds and a diameter in its greatest length of 4½ feet. Mr. Arthur Bibbins has recently secured this historic specimen for the Geological Museum of the Woman's College of Baltimore where it is now preserved.

Dimensions.—The largest specimen is about 1.5 meters in its greatest diameter; breadth of calices from 3 to 8.5 mm. with an average width of 4.6 mm.

Geological horizon.—Miocene, Chesapeake formation.

Locality.—Bellefield and Yorktown on the York River, and at many points on the James River, Virginia. In some of the previous papers on the subject this coral is frequently mentioned as coming from Maryland, but none of the specimens in the collections examined by the writer came from that State.

Collections.—U. S. National Museum; Philadelphia Academy of Natural Sciences; Wagner Free Institute of Science; Johns Hopkins University; Woman's College of Baltimore.

CATALOGUE OF SPECIFIC NAMES EMPLOYED BY WRITERS UPON THE NEOCENE CORALS OF THE UNITED STATES.

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[1] Trans. Am. Phil. Soc., new ser., V, p. 338, or in the Reprint of the Geology of the Virginias, p. 667.

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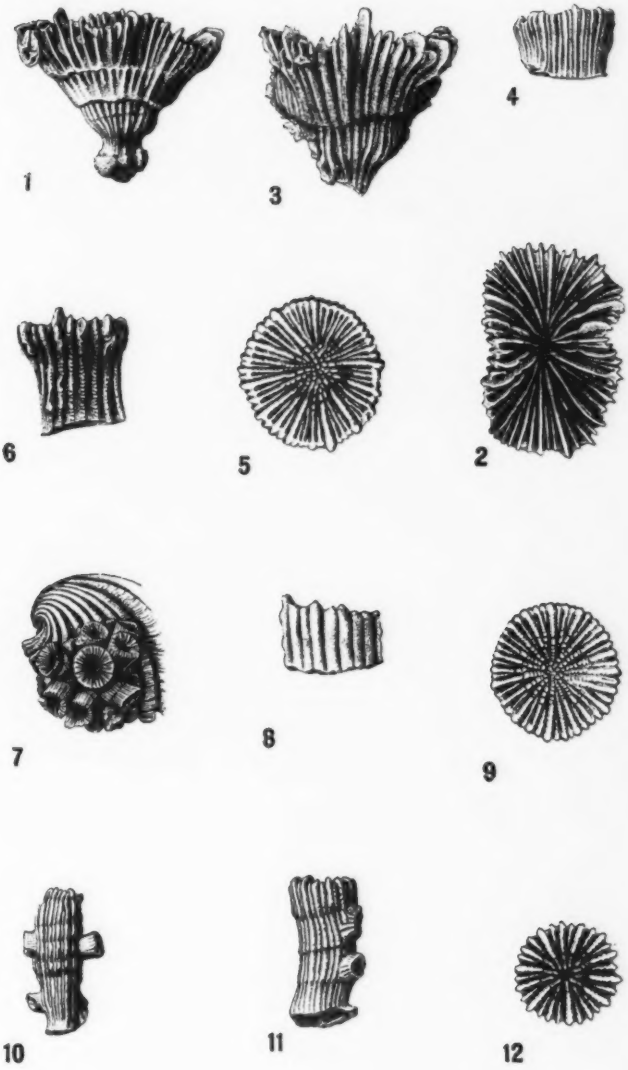
PLATE XV.

Figs. 1–3. *Desmophyllum willcoxi* Gane 184
Fig. 1, view of a specimen from the side; altitude of specimen, 28 mm.; fig. 2, calice of the same, greater diameter, 32 mm.; fig. 3, view of another specimen, looking at end of longer transverse axis, altitude of specimen, 30 mm.

4–6. *Paracyathus vaughani* Gane 185
Fig. 4, view of a specimen from the side, altitude, 6 mm.; fig. 5, calice of the same, greater diameter, 8 mm.; fig. 6, costæ of another specimen enlarged.

7–9. *Phyllangia floridana* Gane 191
Fig. 7, general view, natural size; fig. 8, costæ enlarged; fig. 9, a calice, greater diameter, 6.5 mm.

10–12. *Cladocora johnsoni* Gane 192
Fig. 10, view of a specimen, 11 mm. long; fig. 11, view of another specimen, 7.5 mm. long; fig. 12, calice of the latter, diameter, 3 mm.



NEOCENE CORALS OF THE UNITED STATES.

FOR EXPLANATION OF PLATE SEE PAGE 198.

A NEW FOSSIL SPECIES OF CARYOPHYLLIA FROM CALIFORNIA, AND A NEW GENUS AND SPECIES OF TURBINOLID CORAL FROM JAPAN.

By T. WAYLAND VAUGHAN, A. M.,

Assistant Geologist, U. S. Geological Survey.

A NEW FOSSIL SPECIES OF CARYOPHYLLIA FROM CALIFORNIA.

The coral described below was in some material sent by Mr. Ralph Arnold, of Leland Stanford Junior University, to the U. S. National Museum to be named. Mr. W. H. Dall kindly placed the specimen in my hands for determination. As it proved to be undescribed, the following diagnosis has been prepared.

CARYOPHYLLIA ARNOLDI, new species.

(Plate XVI, figs. 1, 2.)

Form of corallum slightly deformed inverted cone-shaped. A basal scar present, but the coral in its later stages was evidently unattached. Base subacute, calice nearly circular in transverse outline.

Dimensions.—Greater diameter of calice, 16 mm.; lesser diameter of calice, 15.3 mm.; height of corallum, 16.5 mm.; depth of fossa, about 6.5 mm.

Costæ very distinct, low, broad, rounded, or flattish, show no ornamentation, but the specimen is worn and they were probably minutely granulated. There is a tendency to alternation in size, which is pronounced near the base. There is no observable epitheca. The wall is stout, solid, a distinct pseudotheca. The costæ are wide and the intercostal spaces very narrow, simply furrows, and the septa are thickened at the wall. The upper margins of the septa project very slightly above

the upper limit of the corallum wall. There are four complete cycles of septa (forty-eight in all), arranged as follows: Twelve large thick septa, joined to the columella by very thick pali. The width of each palus is equal to the width of its corresponding septum; the upper margins of the palus stands about 2 mm. above the upper surface of the columella, and fully 1 mm. above the notch dividing the palus from the septal lamina. The width of the pali is about 2.5 mm. From the upper margin of the septum to the notch between septum and palus is about 4.5 mm., may be slightly greater. The inner ends of the pali are fused solidly around the columella and to it. On the septal faces are small granulations arranged in curves parallel to the upper septal margins. On the faces of the pali are granulated or serrated crests arranged in curves parallel to the upper margins of the pali. Between each pair of these larger septa are three smaller (one of the third cycle and two of the fourth). The members of the third cycle are narrow above the level of the upper termination of the columella; below this they widen, but do not seem ever to reach the columella. The members of the fourth cycle are narrow, and thin except where they arch over the walls. The columella is essential, is composed of several pieces, trabeculæ, which are firmly soldered one to another and to the inner terminations of the pali by solid basal calcareous deposit. From the upper margins of the septa to the upper termination of the columella is about 6.5 mm.; that is, the calicular fossa is about 6.5 mm. deep. The greater diameter of the upper termination is 5 mm., the lesser 3.5 mm., above whose level, as may be gathered from what preceded, the pali form a regular crown.

Locality.—San Pedro Hill, San Pedro, California.

Geological horizon.—Pleistocene.

Type.—Cat. No. 157509, U.S.N.M.

A NEW GENUS AND SPECIES OF TURBINOLID CORAL FROM JAPAN.

The specimen upon which the subsequent descriptions are based was sent to the U. S. National Museum by Rev. H. Loomis, Yokohama, Japan. Mr. W. H. Dall asked me to determine it, and as it proves to belong to both a new genus and species, the following generic and specific diagnoses have been prepared:

LEVIPALIFER, new genus.

Salient generic features.—Simple Turbinolid; corallum very short, inversely conical in shape, almost discoid; no sign of attachment, living free. Wall naked. Septa within the wall possess entire or faintly crenate margins; external to the wall beset with rounded dentations. Costæ dentate, the dentations with blunt or rounded ends. Four complete cycles of septa; *pali are before all septa and have entire margins.* Columella essential, trabecular.

LEVIPALIFER ORIENTALIS, new species.

(Plate XVI, figs. 3–7.)

Corallum, without any sign of attachment, subdiscoid in form, the base pointed. Transverse outline of the calice circular.

Dimensions.—Diameter, 20 mm.; altitude, 9 mm.

Costæ well developed, thin, distant, correspond to all septa; those of the first and second cycles of the same size; those of the third slightly smaller, and those of the fourth still smaller. They are rather tall at the calicular edge of the wall, becoming lower as the base is approached. Two cycles are continued to the apex of the base. The costal margins are beset with rather tall, rounded or blunt dentations. In some instances the ends of the dentations are swollen. Each dentation marks the emergence on the surface of a small ridge (or stria) along which are arranged rather tall but not very sharp pointed granulations. The lateral faces of the costæ are perpendicular to the corallum wall; that is, the costæ show no, or almost no, thickening at the wall.

There are four complete cycles of septa, arranged in six definite systems. Six of the septa stand isolated from the other septa and extend directly to the columella. Between each pair of these six is a definite group of septa belonging to higher cycles. Those of the third cycle bend toward those of the second, and the members of the fourth bend toward those of the third. Quite frequently the members of the fourth cycle are longer than the inclosed members of the third. The longer member of the fourth cycle for any given half system is the one standing next to the septum of the first cycle. This arrangement is the common one in the Eupsammidæ. The fusion of the septa into the groups above indicated is affected by the pali. The lateral ornamentation of the septa consists of ridges or striæ, which possess a line of divergence slightly interior to the wall and parallel to it, and granulations placed along the striæ. Within the line of divergence the striæ bend toward the interior of the corallum, and exterior to it they bend outward, ultimately downward. On the inner side of the line of divergence the septal margin is entire or shows very faint crenations. Exterior to it each ridge is terminated by a dentation, not very long just at the line of divergence, but quite soon the dentations are larger. The dentations on the peripheral ends of the septa, that is, the costæ, have already been described. When one looks directly at the edge of a septum the striæ are seen to alternate in position, and the septum is usually faintly undulate in a direction parallel to the long axis of the striæ. The granulations are placed along the striæ and are arranged in curves parallel to the septal margin. The granulations are rather tall, but are not sharp-pointed; their tips are blunt or rounded. The septal margins project considerably above the upper edge of the wall; the members of the first and second cycles are equally prominent, and are more exsert than those of the third and fourth

cycles, which are equal in prominence. The septa are distant, thin, weak, and show no marked thickening at the wall.

Pali are before every cycle of septa. Those before the first cycle are the broadest. The pali belonging to each septal group included between the members of the first cycle are deltoid in arrangement. The arrangement is well shown in Plate XVI, fig. 6. The pali are broad and are simple lobes, excepting usually there is an inner tooth before the delta composed of the pali of each group of septa of the third and fourth cycles. *The margins of the pali are entire.* The trabecular make-up of the pali is the same as that of the septa; each palus has its own line of divergence, etc. The fusion of the septa into deltas through the pali is effected usually by synapticula. Excepting these synapticula the interseptal loculi are entirely vacant.

Some hints have already been thrown out as to the make-up of the wall. It is entirely naked, imperforate, and rather thin, thickening very little from internal calcareous deposit; no processes extending inward from it between the septa (such as are quite common in some Turbinolid genera) were seen. As the septa and costæ do not thicken in crossing the wall, this coral would be said to possess a *eutheca.* In my mind the point to be emphasized is that the septa are distant and thin, and the connecting wall is also thin. The wall between the costæ possesses no ornamentation.

The columella is large, well-developed, trabecular, and spongy.

Locality.—Boshiu (=Awa), eastern coast of Japan.

Type.—Cat. No. 19391, U.S.N.M.

Bathymetric distribution not known.

Remarks.—The natural group to which this coral belongs is very evident. It is very closely related to *Trochocyathus* and *Deltocyathus.* It is separated from the latter genus solely by possessing one more crown of pali. The genus *Leptocyathus* Milne-Edwards and Haime, was founded to receive the coral from the London Clay, designated by them *Leptocyathus elegans,*[1] which, according to them, possesses denticulate pali before all cycles of the septa. The pali of *Leptocyathus,* according to the figure (Plate III, fig. 6c), are small, and do not exhibit a noticeably deltoid arrangement. There are other differences; the septa are much thickened at the wall, and the costæ possess very broad bases. Pourtalès[2] has described a species, found off Conch Reef and Tennessee Reef, Florida waters, as *Leptocyathus stimpsoni.* I doubt if this coral is really a *Leptocyathus.* It possesses many points of difference from the type species *L. elegans,* and certainly is not closely related to the species here described.

It may be repeated that *Levipalifer* is most closely related to *Deltocyathus.*

[1] Monograph Brit. Foss. Corals, Paleontograph. Soc., 1850, pp. xiv, 21, 22, pl. III. figs. 6, 6a–c.

[2] Ill. Cat. Mus. Comp. Zool., No. IV (Deep Sea Corals), 1871, p. 12, pl. III, figs. 1–3.

EXPLANATION OF PLATE.

[All drawings made by Dr. J. C. McConnell.]

PLATE XVI.

Figs. 1, 2. ***Caryophyllia arnoldi***, new species. Cat. No. 157509, U.S.N.M.
Fig. 1, upright view; height of corallum, 16.5 mm.; fig. 2, view of calice from above; greater diameter of calice, 16 mm.

3–7. ***Levipalifer orientalis***, new genus and new species. Cat. No. 19391, U.S.N.M.
Fig. 3, view of base; diameter of base, 20 mm.; fig. 4, upright view; altitude, 9 mm.; fig. 5, portion of costa and exsert portion of septum, looking at edge, enlarged, shows character of granulations on the septal faces; fig. 6, one complete system of septa, enlarged, shows the arrangement of the pali; fig. 7, view of the sides of a septum of the fourth cycle, and one of the first cycle, showing pali in profile, the septal granulations, etc. The notch behind the pali is usually deeper than in the case of the palus in the foreground.

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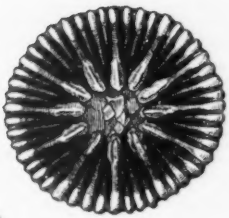

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NEW TURBINOLID CORALS.

FOR EXPLANATION OF PLATE SEE PAGE 203.

NOTES ON BIRDS COLLECTED BY DOCTOR W. L. ABBOTT IN CENTRAL ASIA.

By HARRY C. OBERHOLSER,
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Dr. Abbott's earliest collections of birds from Cashmere and Ladak have already been fully treated by Dr. C. W. Richmond.[1] Upon leaving Madagascar, in 1895, Dr. Abbott proceeded again to Cashmere, where he spent the remainder of the year—some four months—mostly in places previously visited. Again, in 1897, he was there for a month or so from about the middle of October, having come from Ladak, in which latter region, at various localities, he had been collecting since the middle of June.

As the ornithological results of these later visits to Central Asia, the United States National Museum has duly received two consignments of specimens; and at the request of the curator of the division of birds a list of them is here presented. Although these collections number together only 142 specimens, representing 62 species, they comprise several birds of considerable interest and a number not previously obtained by Dr. Abbott. All matter within quotation marks is to be credited to the collector.

The writer is under obligation to Dr. Richmond for his uniform courtesy during the preparation of this paper, as well as for permission to make use of his notes upon several of the larger species.

Family LARIDÆ.

LARUS BRUNNEICEPHALUS Jerdon.

Larus brunneicephalus JERDON, Madras Journ., XII, 1840, p. 25.

Two adult females in somewhat worn breeding plumage, from Tsokr Chumo Lake, Ladak, at 15,000 feet altitude, July 13, 1897. "Iris pale greenish; orbital skin red; feet red; bill dark red. Length, 16⅞ inches. A colony of 15 or 20 individuals at this lake. Nests not found."

[1] Proc. U. S. Nat. Mus., XVIII, 1896, pp. 451–503.

LARUS RIDIBUNDUS Linnæus.

Larus ridibundus LINNÆUS, Syst. Nat., 12th ed., I, 1766, p. 225.

One specimen, from the Valley of Cashmere. This is an adult male in winter plumage, with no brown hood, and with dusky only on auriculars; the black and white areas on primaries are very sharply defined. "Irides blackish brown; feet red; claws black; bill red, the tip black. Length, 16 inches."

STERNA HIRUNDO TIBETANA (Saunders).

Sterna tibetana SAUNDERS, Proc. Zool. Soc. Lond., 1876, p. 649.

Two adult males: one from the Indus River at Mya, Ladak, 13,000 feet, September 11, 1897; the other from Tsomoriri Lake, Ladak, 15,000 feet, July 29, 1897. "Length, 13½ and 14⅛ inches, respectively. Iris dark brown; bill red, the tip black; feet red; claws black."

Careful comparison with a large series of American and European specimens indicates that the bird from Thibet, though not specifically distinct from *S. hirundo*, is yet well worthy of separation as a geographical race, to which the name *tibetana* is applicable. This central Asian form is much darker on the mantle and much less whitish on the nape; the lower parts also are of a deeper gray, particularly on the flanks.

Family CHARADRIIDAE.

OCHTHODROMUS INCONSPICUUS (Wagler).

Charadrius inconspicuus WAGLER, Isis, 1829, p. 651.
Charadrius pyrrhothorax GOULD, Birds Europe, IV, 1837, pl. 299.
Ægialitis pamirensis RICHMOND, Proc. U. S. Nat. Mus., XVIII, 1896, p. 589.

Six specimens (four adult males, one female, and one immature male) from various localities in Ladak, at from 14,000 to 15,000 feet; taken July 7 to 20, and September 8, 1897. Among the males the amount and shade of the ochraceous on the crown varies considerably, and on the upper tail-coverts of one specimen there is very little brown; otherwise all are very similar. There are a few small flecks of white in the black of the forehead and lores, particularly the latter, but this effect is due to the wearing off of the black tips of the feathers, with its consequent exposure of the white basal portions, and would probably not be noticeable in fresh plumage. "Length, 7¼ to 7½ inches. Iris dark brown; bill, feet, and claws black."

Dr. Sharpe dismisses the female of this species with the remark that it is "similar to the male;"[1] but as a matter of fact it differs very noticeably in having the black of the forehead and lores replaced by pale ochraceous brown mixed with white, that of the subocular and auricular regions by dull brown. The crown is also duller, the breastband

[1] Cat. Birds Brit. Mus., XXIV, 1896, p. 228.

paler, the collar on hind neck narrower and less well defined. The young bird resembles the adult female, but is darker brown above, with buffy ochraceous margins to all the feathers; there is also more buffy on the sides of the head, the breastband is paler, and the entire lower surface, with the exception of the crissum, is more or less tinged with buffy.

Careful comparisons with the type of Dr. Richmond's *Ægialitis pamirensis* prove beyond a doubt that it is the same as the bird Dr. Sharpe identifies[1] as *pyrrhothorax* of Gould. When Dr. Richmond described his *pamirensis* he had not access to the volume of the British Museum Catalogue containing the Limicolæ; and the species is synonymized with *mongolus* in Seebohm's Geographical Distribution of Plovers, Sandpipers, and Snipes. Since no specimens of *pyrrhothorax* at that time existed in the United States National Museum collection, the mistake was of course a very natural one. The correct specific name of this species seems to be *inconspicuus* Wagler,[2] the description and probable locality pointing to this identification, and this name antedating *pyrrhothorax* Gould by eight years.

Family SCOLOPACIDÆ.

GALLINAGO SOLITARIA Hodgson.

Gallinago solitaria HODGSON, Gleanings in Science, III, 1831, p. 238.

One male of this handsome snipe was taken on December 10, 1895, in the Valley of Cashmere. "Iris dark brown; bill plumbeous, tip black; feet and legs pale yellowish green; toes black. Length, 12¼ inches."

HELODROMAS OCHROPUS (Linnæus).

Tringa ocrophus (err. typ.) LINNÆUS, Syst. Nat., 10th ed., I, 1758, p. 149.
Totanus ochropus TEMMINCK, Man. d'Orn., 1815, p. 420.

One specimen in winter plumage, from the Valley of Cashmere. "Iris dark brown; feet and legs olive plumbeous; claws black; bill black, olive at base. Length, 9½ inches."

TOTANUS TOTANUS EURHINUS, new subspecies.

Chars. subsp.—Like true *Totanus totanus*, but very much larger.

Description.—Type, male, adult, Cat. No. 162823, U.S.N.M.; Lake Tsomoriri, Ladak, 15,000 feet, July 29, 1897; Dr. W. L. Abbott. Above rufescent broccoli brown, the feathers everywhere with dark brown centers, the back more or less irregularly barred with the same; rump pure white, sparingly marked with brownish; tail and upper tail-coverts dull white, heavily barred with sepia brown, the terminal

[1] Cat. Birds Brit. Mus., XXIV, 1896, p. 226.

[2] Isis, 1829, p. 651.

portion of central tail-feathers buffy; wings fuscous, the innermost secondaries like the back and barred on exposed portions with dark brown; remainder of secondaries white, but pale brown on concealed bases; greater coverts white or grayish distally, brownish gray basally, and barred with sepia; median coverts brownish gray, barred with sepia; lesser coverts almost plain; lower surface white, more or less heavily marked throughout with sepia, these markings taking on throat and breast the form of broad streaks, on flanks, sides, and crissum of bars, and elsewhere of more or less irregular spots; lining of wing white, varied with brownish, except on axillars.

The form of *Totanus totanus*[1] inhabiting Central and Eastern Asia, although seemingly identical with the European bird in color and markings, is yet so much larger, particularly in length of wing, tail, and culmen, that its separation as a subspecies appears to be warranted. All of the many names which the species possesses are without doubt exclusively applicable to the European bird, thus leaving the Eastern form without a name. The following table of millimeter measurements presents the difference between the two races:

Totanus totanus totanus.

Sex.	Locality.	Wing.	Tail.	Exposed culmen.	Tarsus.	Middle toe.
Female	Havre, France	156	62	46	50	30
Do	do	158	64	39	44	28
Male	do	152	65	41	45	30
Do	do	151	62	40	41	29
Do	France	150	64	41	47	30
Average (5 specimens)		153.4	63.4	41.4	45.4	29.4

Totanus totanus eurhinus.

Sex.	Locality.	Wing.	Tail.	Exposed culmen.	Tarsus.	Middle toe.
Female	Kashgar, Turkestan	160	69	44	44	28
Do	Lake Tsomoriri, Ladak	170	67	51	51	32
Male	do	160	65	44	47	30
Do	do	163	67	47	45	31
Do	Hanlé, Ladak	162	66	47	49	30
Average (5 specimens)		163	66.8	46.6	47.2	30.2

Four specimens of *Totanus t. eurhinus*, including the type, are in the present collection; three of these are from Lake Tsomoriri, Ladak, at 15,000 feet; the other from Hanlé, Rupshu, Ladak, 14,000 feet; and all are summer birds. "Length of male, 11½ inches; of female, 11¾ inches; bill black, orange brown at base beneath; iris dark brown; feet orange red; claws black."

[1] *Scolopax totanus* Linnæus, Syst. Nat., 10th ed., I, 1758, p. 145 (=*Totanus calidris* auct.).

Family ANATIDÆ.

QUERQUEDULA QUERQUEDULA (Linnæus)

Anas querquedula LINNÆUS, Syst. Nat., 10th ed., I, 1758, p. 126.
Querquedula querquedula BAIRD, Am. Journ. Sci. and Arts, XLI, 1866, p. 339.

One apparently adult female, from Rupshu, Ladak, at 13,000 feet, September 9, 1897. "Length, 16 inches." The white of the throat is quite pure, but that of the posterior lower surface is decidedly grayish, as the bases of the feathers show through the overlaid white tips.

CASARCA CASARCA (Linnæus).

Anas casarca LINNÆUS, Syst. Nat., 12th ed., III, App., 1768, p. 224
Casarca casarca ALLEN, Auk, XIII, 1896, p. 164.

One adult female, from Tsokr Chumo Lake, Ladak, taken July 11, 1897. The plumage of this example is much worn, and the colors of back and head much bleached. "Bill and feet black. Length, 24 inches."

Family PHASIANIDÆ.

PUCRASIA MACROLOPHA BIDDULPHI (Marshall).

Pucrasia biddulphi MARSHALL, Ibis, 1879, p. 461.

One example, from the Pir Panjal Range, Cashmere, at an altitude of 8,000 feet. This is an immature male, and is molting about the head. "Iris dark brown; feet leaden; claws dark leaden. Length, 18½ inches."

LOPHOPHORUS REFULGENS Temminck.

Lophophorus refulgens TEMMINCK, Pig. et Gall., II, 1813, p. 355.

One adult male from near Bandipoor, Cashmere, October 6, 1895. "Length, 29½ inches; weight, 6½ pounds."

TETRAOGALLUS TIBETANUS Gould.

Tetraogallus tibetanus GOULD, Proc. Zool. Soc. Lond., 1853, p. 47.

One adult male, from Takalungla, Ladak, at the remarkable altitude of 17,000 feet. "Feet brick red; claws dark horn brown; orbital skin dull orange; iris dark brown; bill horny orange."

Family COLUMBIDÆ.

COLUMBA RUPESTRIS PALLIDA Rothschild and Hartert.

Columba rupestris pallida ROTHSCHILD and HARTERT, Ornith. Monatsber., I, 1893, p. 41.

Three specimens from Ladak: two of these are from Gya, at 14,000 feet, the other from Hanlé Goupa. "Bill black; cere powdery white; feet red, claws blackish horny; iris, male, orange red; female, brick red.

Common about villages and cultivation [Gya]; common throughout Rupshu up to 16,000 and 17,000 feet. It comes picking around the camps and sheepfolds of the Champas." These examples are identical with others from Cashmere and the Thian Shan Mountains previously obtained by Dr. Abbott, and recorded by Dr. Richmond as true *rupestris*.[1] They are, however, undoubtedly referable to *Columba r. pallida*, exhibiting all the characteristics of that race.

TURTUR SURATENSIS (Gmelin).

Columba suratensis GMELIN, Syst. Nat., I, 1788, p. 778.
Turtur suratensis STRICKLAND, Proc. Zool. Soc. Lond., 1842, p. 168.

One adult male, from the Valley of Cashmere. "Iris dull red; bill black; feet livid purple; length, 11⅜ inches."

Family VULTURIDÆ.

GYPS HIMALAYENSIS Hume

Gyps himalayensis HUME, Rough Notes, I, 1869, p. 14.

Two specimens accompanied by the following data.

"Male, Lolab, Cashmere, November 3, 1895; 8,000 feet. Iris mottled brownish gray; bill pale greenish horn; cere dark gray horn; bare skin on throat pale blue; feet pale greenish; claws blackish. Length, 46½ inches; extent, 110 inches; weight, 21 pounds."

"Female, Sind Valley, Cashmere, December 13, 1895; 6,000 feet. Iris dark brown; bill pale greenish horny (like jade); cere horny blackish brown; bare skin of head pale blue; feet pale greenish slate color; claws black. Length, 46 inches; extent, 107 inches; weight, 19 pounds."

The male seems to be adult, although the crop patch is quite dark brown instead of whitish fawn color; the female, judging from the darker colors on the upper parts, appears to be more or less immature.

Family FALCONIDÆ.

CERCHNEIS TINNUNCULA INTERSTINCTA (McClelland).

Falco interstinctus MCCLELLAND, Proc. Zool. Soc. Lond., 1839, p. 154.

Two adult males of this handsome falcon: one from Zogila Pass, Cashmere, at 10,500 feet; the other from Machalung, Indus Valley, Ladak. The latter specimen is a bird in process of molt (September 17). "Its stomach contained lizards."

Specimens of the kestrel from Cashmere and Ladak are much darker, particularly above, than those from Europe, and should apparently bear the subspecific name *interstincta* McClelland. This race was originally described from specimens obtained in Assam, and it undoubtedly occu-

[1] Proc. U. S. Nat. Mus., XVIII, 1896, p. 587.

pies at least the whole of the Himalaya region, with very probably a large part of India. Birds from the Thian Shan Mountains and eastern Turkestan are, however, paler, and apparently must be referred to the European form.

FALCO PEREGRINUS Tunstall.

Falco peregrinus TUNSTALL, Orn. Brit., 1771, p. 1.

Three specimens, all from the Valley of Cashmere. "Iris dark brown; bill horny blue, black at tip, greenish yellow at base; cere and eyelids yellow; feet yellow; claws black. Length of male, 16¼ inches; of female, 18½ inches; weight of female, 2½ pounds. Crop and stomach of latter contained the remains of a teal."

One of these examples, which is apparently not quite adult, is darker above than the others, with the markings below larger as well as more numerous, and with a conspicuous tinge of ochraceous on the abdomen. There seems to be little or no difference between similar plumages of the birds from Asia and Europe. Our limited material indicates that European specimens are less bluish above and darker on the head; but this distinction very possibly would not prove constant in a larger series.

The *Falco peregrinus* of Tunstall, as above quoted, is apparently the earliest available name for the peregrine falcon, being 17 years prior to Gmelin's names. Most of the new specific designations in Tunstall's Ornithologica Britannica are mere *nomina nuda*, but some, among them *Falco peregrinus*, have references to Pennant's British Zoology, and are thus rendered tenable.

MILVUS GOVINDA Sykes.

Milvus govinda SYKES, Proc. Zool. Soc. Lond., 1832, p. 81.

One adult male from the Valley of Cashmere, December 4, 1895. "Iris brown; bill black, horny blue at base; cere pale horny; feet dirty white; claws black. Length, 24½ inches."

HALIÆETUS LEUCORYPHUS (Pallas).

Aquila leucorypha PALLAS, Reis. Russ. Reichs, I, 1771, p. 454.
Haliaetos leucorypha KEYSERLING and BLASIUS, Wirb. Eur., 1840, p. xxx.

Two specimens; one of them a male from the Hanlé River, Rupshu, Ladak, taken September 2, 1897. "Length, 30½ inches. Poisoned while feeding on the dead carcass of a wild ass (Kiang)." The other example is a female from Woolar Lake, Vale of Cashmere, September 16, 1895. "Iris brownish gray; bill dull black; cere and base of bill grayish white; feet dirty white; claws black. Length, 31½ inches. Feeds on dead fish and carrion; foully dirty."

The plumage of the female has much ochraceous, the tips and edges of the feathers everywhere being more or less tinged with either this

color or fulvous, darkest on the head and neck. The breast and abdomen are quite uniform ochraceous, the throat darker, more fulvous, the crissum more brownish; the tail is almost plain blackish brown, mottled somewhat with grayish near its base. The male is far from being so deeply ochraceous above, the edgings on the feathers of back and wings being whitish or buffy, producing a curiously mottled appearance, and forming thus a conspicuous contrast to the plumage of the female. Below the color is pale dull brownish, lighter and more ochraceous on the abdomen and foreneck, darkest on the throat; tail black, slightly tipped with whitish, and with a broad ill-defined bar of mixed gray and dull white across its middle portion.

HALIÆETUS ALBICILLUS (Linnæus).

Falco albicilla LINNÆUS, Syst. Nat., 10th ed., I, 1758, p. 89.
Haliaetus albicilla LEACH, Syst. Cat. M. B. Brit. Mus., 1816, p. 9.

Two specimens, both taken in the Valley of Cashmere, on December 19, 1895. "Male: Iris straw color; feet yellow; claws black. Length, 32½ inches; weight, 8 pounds. Stomach contained remains of a green woodpecker (*Gecinus squamatus*). Female: Iris straw color; bill and cere horny yellow; feet yellow; claws black. Length, 34½ inches; weight, 10 pounds. Crop contained a thrush (*Merula*); stomach contained remains of thrushes and rats."

Both of these specimens seem to be fully adult, their tails white distally, except for small dusky markings near the ends of the feathers. The many light tips, and some altogether paler feathers on both upper and lower parts, give to the plumage in places a conspicuously mottled appearance. These individuals appear to be perfectly identical with one from Korea.

AQUILA BIFASCIATA J. E. Gray.

Aquila bifasciata J. E. GRAY, Illus. Ind. Zool., I, 1832, pl. XVII.

Three specimens, all females, taken in the Valley of Cashmere, December 20 and 22, 1895. "Iris dark brown; bill horny blue, tip black; gape, cere, and feet yellow; claws black. Length, 31–32 inches; weight, 7½ pounds. This species is very common in the valley at this season, and is very tame, sitting on the trees in the villages, probably because rats are plentiful near the houses. The stomachs of two of the birds taken contained remains of *Mus rattus*."

Two of the present examples are apparently typical adults, one of them evidently in process of molt both above and below. The remaining specimen is seemingly immature, being darker than the others, particularly on scapulars, wing-coverts, head, and under surface, while the primary-coverts as well as the greater series lack any indication of the paler tips characteristic of the adult. In this condition *Aquila bifasciata* superficially much resembles *A. chrysaëtos*, but is everywhere paler; has fewer light fulvous feathers on occiput and nape; and the

light ashy bars on the tail extend throughout, not leaving a broad band of black at the tip.

The present writer is quite inclined to agree with Dr. Sharpe in his identification[1] of the present species with the *Aquila mogilnik* of S. G. Gmelin;[2] but it is perhaps better, particularly in view of the confusion existing through diversity of opinion, to abandon entirely the use of Gmelin's name, simply considering it unrecognizable—the course so strongly urged by Mr. Blanford.[3] The proper name for the steppe eagle will, of course, in such event be *Aquila bifasciata* Gray.

AQUILA HELIACA Savigny.

Aquila heliaca SAVIGNY, Descr. de l'Egypte, 1809, p. 45[1], pl. XII.

Four specimens, all from the Valley of Cashmere, and taken in December, 1895.

"Female adult: Iris gray, mottled with brown spots; bill horny blue with black tip; cere dull horny yellowish white; feet yellow; claws black. Length, 32 inches; weight, 8⅛ pounds. Crop and stomach filled with the remains of *Mus rattus*.

"Female adult: Iris gray, mottled with brown; bill horny blue, tip black; cere dull horny yellow; feet pale dirty yellow; claws black. Length, 32¼ inches; weight, 9¼ pounds. Stomach contained remains of mongoose (*Herpestes auropunctatus*).

"Immature [sex not given, but probably male]: Iris straw color, mottled with brown on lower half; bill horny blue, black at the tips; cere horny white, with a greenish tinge; toes pale yellow; claws black. Length, 31 inches; weight, 5½ pounds.

"Female immature: Iris brownish gray; bill horny blue, the tip black; cere horny yellow; feet yellow; claws black. Length, 31¾ inches; weight, 7 pounds. Stomach contained remains of a grebe (*Podiceps*)."

In the two immature birds the dark streaking below is confined to the jugulum, breast, and upper abdomen; in the supposed male it is quite narrow, but in the female is so broad as to be in many places confluent.

BUTEO FEROX (Gmelin).

Accipiter ferox S. G. GMELIN, Nov. Comm. Ac. Sci. Imp. Petrop., XV, 1771, p. 442, pl. X.

Buteo ferox CABANIS, Journ. f. Ornith., 1854, p. 260.

Eighteen specimens of this very interesting bird were secured by Dr. Abbott, all but one of them in the Vale of Cashmere. The series contains no two individuals exactly alike, and represents apparently almost if not quite all the principal variations of plumage to which the species

[1] Cat. Birds Brit. Mus., I, 1874, p. 240.

[2] Nov. Comm. Acad. Sci. Imp. Petrop., XV, 1771, p. 445, pl. XI *b*

[3] Ibis, 1894, pp. 283-286.

is subject. In view of this, it seems well to present a brief description of each example, to which are also added, as of interest, the original label notes of the collector.

a. Male adult, December 4, 1895. Very dark above and below; no light spots on abdomen or thighs; some rufous streaks on throat, also on nape; tail very dark, with no broad subterminal bar, the light interspaces on central feathers so dark that the bars are but slightly indicated. "Bill black, bluish at base; cere yellowish green; gape yellow; irides pale brownish gray; feet yellow; claws black. Length, 23¼ inches; weight, 30 ounces. Stomach full of small frogs and grasshoppers; crop contained 17 small frogs and 1 grasshopper. Thin and in poor condition."

b. Male adult, December 7, 1895. Very dark, with no spots on abdomen or thighs, but rich rufous edgings on the feathers of breast, lower abdomen, and under tail-coverts; nape black and white with rufous streaks on sides; tail with very light gray, almost white, interspaces. "Bill black, pale horny at base; gape yellow; cere orange yellow; feet yellow; claws black; irides dark brown. Length, 21½ inches. Excessively fat."

c. Male adult, December 22, 1895. Somewhat like *b*, but much lighter below, with buffy streaks on throat and breast; light interspaces of central rectrices dirty gray. "Bill black, base horny blue; cere yellowish green; feet yellow; claws black; irides brown. Length, 22 inches; weight 32 ounces. Stomach contained frogs." Very fat.

d. Male adult, December 23, 1895. Very dark above and below, like *a*, but abdomen relieved by a few whitish spots on the sides of the feathers; some whitish mottlings on back and scapulars; a little more rufous on head and nape, some also on throat and breast; light interspaces on tail feathers paler and grayer; tail with a broad blackish subterminal band. "Bill black at tip, base horny blue; cere greenish yellow; gape and feet yellow; claws black; irides dark brown. Length, 22 inches."

e. Male adult, December 27, 1895. Much like *c*, but rufous on throat and breast decidedly darker; more of rufous on crown and a wash of the same color on upper tail-coverts; gray interspaces of tail light, and the black bars broken. "Bill black, its base horny blue; feet yellow; claws black; cere horny yellow; irides dark brown. Length, 21 inches; weight, 34 ounces."

f. Female adult, December 3, 1895. Throat, breast and nape rufous, the throat variously mottled; feathers of thighs, abdomen and lower breast with large whitish spots on each side of shafts; upper tail-coverts blackish, with two to three rows of whitish gray bars; tail dirty gray, with transverse markings of black. "Bill horny black, horny blue beneath; cere yellowish green; feet dull yellow; claws black; irides hair brown. Length, 23¾ inches; weight, 2¾ pounds. Excessively fat."

g. Female adult, December 19, 1895. Almost like *f*, but having considerable rufous mixed with the gray of the tail, and the interrupted bars on upper tail-coverts pale rufous instead of grayish white. "Bill black, base horny blue; gape yellow; cere horny yellow; irides dark brown. Stomach contained frogs. Length, 23½ inches."

h. Female adult, December 19, 1895. Very dark, like *b*, but with less rufous on lower parts; under tail-coverts broadly tipped with ochraceous; tail much darker gray on light interspaces, with here and there some tinge of rufous. "Bill black, base horny blue; gape yellow; cere horny yellow; irides dark brown. Length, 23¼ inches. Stomach contained remains of frogs."

i. Female adult, December 19, 1895. Similar to *b*, but lighter rufous on throat, breast, and abdomen, mottled by lighter tips to the feathers; tail with a rufous tinge in places, the dark bars on central feathers almost V-shaped. "Bill black, the base horny blue; feet yellow; claws black. Length, 23 inches. Stomach contained frogs."

j. Female adult, December 24, 1895. Resembling *c*, but with more rufous in the markings of the throat, breast, head, and nape; light interspaces of tail paler and more grayish, with a considerable admixture of rufous, the blackish bars much broken, the subterminal bar narrow, the light terminal one very broad. "Bill black, the base horny blue; feet yellow; claws black; irides dark brown. Length, 24 inches. weight, 2½ pounds."

k. Female adult, December 25, 1895. Almost like *j*, but with fewer spots on abdomen; dark tail bars not broken, and terminal light bar not very broad. "Bill black, the base horny greenish; cere dull horny green; feet yellow; claws black; irides dark brown. Length, 24 inches; weight, 3 pounds."

l. Male immature, December 3, 1895. Throat and breast mingled rufous and buff, but darker than in *f*; abdomen and thighs with light spots; nape mixed dark brown and buff; tail gray and rufous, with the black bars, excepting the subterminal one, much broken or obsolete, the two central feathers with blackish streaks on sides of shafts and broken crossbars on their outer borders. "Bill black, horny blue at base; gape yellow; cere greenish; feet yellow; claws black; irides hair brown. Length, 21¼ inches; weight, 2 pounds."

m. Male immature, Sind Valley, Cashmere, at 6,000 feet, December 12, 1895. Light below, but with a motted band of dark rufous across the middle of under surface, the brown and rufous markings darker and heavier than in *o*; thighs very deeply colored, the feathers with rufous margins; inferior tail-coverts buffy, with some rufous markings; center of nape with a patch of black, encircled by buff-bordered brown feathers; rump, black and upper tail-coverts blackish, the two last with light rufous tips to the feathers; scapulars dark, with buffy and rufous edgings; tail with some rufous touches on all the feathers, the dark bars wavy and irregular. "Bill black, horny blue at base; cere yel-

lowish green; gape yellow; feet yellow; claws black; irides dark brown. Length, 21¾ inches."

n. Male immature, December 25, 1895. Almost exactly like *p*, but forehead very dark; under tail-coverts nearly all rufous; gray of tail replaced wholly by rufous; black tail bars very much broken, and to some extent obsolete, the subterminal black bar narrow. "Bill black, bluish horny at base; cere dull horny green; feet yellow; claws black; irides dark brown. Length, 20¾ inches; weight, 34 ounces. Crop full of frogs."

o. Female immature December 8, 1895. Very pale buff below, with hair-like shaft lines on throat, wider streaks on breast, and still broader markings of brown on sides of abdomen; much reddish brown on thighs; under tail-coverts buffy white; upper parts light sandy brown, the feathers with dark centers and yet darker shaft lines; superior tail-coverts with a slight tinge of rufous; tail dusky gray, with lighter interspaces and no broad subterminal dark bar. "Bill black, blue at base; cere and gape pale yellowish green; feet yellow; claws black; irides pale straw color. Length, 23¾ inches. Stomach contained remains of a large rat (*Neosocia bengalensis*)."

p. Female immature, December 18, 1895. Under parts with a strong wash of rusty; throat and breast with narrow streaks of dark brown, and larger markings on abdomen; thighs and sides of body very dark brown, the feathers bordered with rufous; nape with a black and rusty spot; back and head deep brown, most of the feathers with broad margins and tips of buffy, though some with rufous edgings; upper tail-coverts dark brown, the feathers with ochraceous tips; tail with a considerable rufous wash, the dark bars nearly obliterated on the central and on some of the lateral rectrices. "Bill black, base horny blue; cere greenish; feet yellow; claws black; irides brown. Length, 24 inches. Stomach contained remains of mice."

q. Female immature, December 22, 1895. Very light below, like *o*, but brown spots on abdomen heavier and more numerous; tail much lighter, with its dark bars narrower and with no broad subterminal bar. "Bill black, base horny blue; cere pale yellowish green; gape dull yellow; feet yellow; claws black; irides grayish white. Length, 24 inches; weight, 34 ounces. Stomach contained remains of frogs and mice."

r. Female immature, December 24, 1895. Rufescent below, as in *p*, but streaks on throat broader; breast and abdomen with conspicuous dark spots; thighs very dark; top of head deep brown, but nape light; upper tail-coverts with broad rufous tips, as in *p;* light interspaces on tail grayish white with very little rufous, the dark bars almost V-shaped. "Bill black, base horny blue; cere dull horny green; feet yellow; claws black; irides pale mottled brown. Length, 26 inches; weight, 3 pounds. Stomach contained a mouse."

The changes of plumage in this species are not a little puzzling.

There seem to be, however, four principal phases: One in which the lower parts are very light colored, with little or no rufous, and with comparatively inconspicuous streaking; another, in which the under surface has more rufous, is much streaked anteriorly and barred or mottled posteriorly; a third, in which the entire lower surface is almost without obvious streakings, being rufous on throat and breast and dull brown on the hinder portions; and a fourth, in which the whole plumage above and below is almost uniform sooty brown. Connecting these several places there exists an almost unbroken series of intermediates. Doctor Sharpe considers that the last-mentioned condition is the very old bird,[1] and that each individual is very light when young, gradually darkening with advancing years. The present series of specimens offers much to corroborate this theory, and very little, if indeed anything, to oppose. The birds in the first of the above-mentioned phases, are without any doubt very young, and those of the last two are just as unquestionably adults. Those of the second phase are not so satisfactorily determinable, but they seem to be in a transition state, although how many years are required to assume this plumage must still, of course, be a matter of conjecture. Were any of the darkest specimens young birds they would easily establish a case of dimorphism very similar to that of the American *Buteo swainsoni*, to which, in its various phases of plumage, the present species bears no slight resemblance. Without such examples, however, it seems premature to advance this hypothesis as more than a suggestion, and in the light of our present knowledge we must regard the various differences of plumage as the result of age. Only one individual of this series has a completely red tail, though several have a greater or less tinge of rufous. The old adults, as also the very young birds, appear not to have a rufous tail; so that unless we are in error as to the sequence of plumage, the rufous tail belongs, rather curiously, to a transition stage.

In some conditions of plumage the present species is very difficult to distinguish from *Buteo desertorum*, but the larger size of the former will usually serve for identification.

ACCIPITER NISUS (Linnæus).

Falco nisus LINNÆUS, Syst. Nat., 10th ed., I, 1758, p. 92.
Accipiter nisus PALLAS, Zoogr. Rosso-As., I, 1826, p. 370.

Two examples. One is an adult male from Sind Valley, Cashmere, at 6,000 feet altitude, taken December 14, 1895: "Iris and feet yellow; claws black; bill black, the base horny blue. Length, 13¼ inches." The other is an immature female from Srinagar, Cashmere, December 30, 1895: "Iris yellow; bill black, horny blue at base; cere yellowish green; feet yellow with a tinge of green on tarsus; claws black. Length, 15⅛ inches. Stomach contained the remains of small birds. This hawk was pursuing a jackdaw when shot."

[1] Cat. Birds Brit. Mus., I, 1874, p. 177.

The male is in fully adult plumage, and the rufous bars on the breast are so broad as to be in places confluent. It is darker above than a specimen from Egypt, but the present series indicates this difference to be individual rather than geographical.

CIRCUS CYANEUS (Linnæus).

Falco cyaneus LINNÆUS, Syst. Nat., 12th ed., I, 1766, p. 126.
Circus cyaneus BOIE, Isis, 1822, p. 549.

One fine adult male of this pretty hawk was secured by Dr. Abbott in the Sind Valley, Cashmere, December 11, 1895. "Iris golden yellow; bill black, lower mandible horny blue at base; cere yellowish green; legs bright yellow; claws black. Length, 18½ inches. Stomach and crop contained the remains of a thrush."

Family BUBONIDÆ.

SYRNIUM ALUCO BIDDULPHI (Scully).

Syrnium biddulphi SCULLY, Ibis, 1881, p. 423.
Syrnium aluco biddulphi RICHMOND, Proc. U. S. Nat. Mus., XVIII, 1896, p. 456.

One adult female, from "north of the Vale of Cashmere," at 7,000 feet altitude, October 26, 1895. "Claws dull black; bill pale waxy green, the cere slightly darker. Length, 18½ inches. Crop contained remains of a species of thrush (*Merula*) and of some mice."

BUBO BUBO TURCOMANUS (Eversmann).

Strix turcomana EVERSMANN, Add. Pall. Zoogr. Rosso-As., I, 1835, p. 3.
Bubo bubo turcomanus RICHMOND, Proc. U. S. Nat. Mus., XVIII, 1896, p. 455.

One adult male from the Valley of Cashmere, December 27, 1895. "Iris golden yellow; bill black; cere dull blackish horny; claws horny black. Length, 22½ inches; weight, 3⅛ pounds. Stomach contained some mouse hair."

Family ALCEDINIDÆ.

ALCEDO ISPIDA Linnæus.

Alcedo ispida LINNÆUS, Syst. Nat., 10th ed., I, 1758, p. 115.

An immature male from the Valley of Cashmere. "Bill black; iris dark brown; tarsi and soles of feet dull red; upper surface of toes brown. Length, 6⅞ inches." There seem to be absolutely no characters even subspecifically to distinguish *Alcedo bengalensis* from *A. ispida*.

Family PICIDÆ.

GECINUS SQUAMATUS (Vigors).

Picus squamatus VIGORS, Proc. Zool. Soc. Lond., 1830, p. 8.
Gecinus squamatus GRAY, Genera Birds, II, 1846, p. 438.

Two adult specimens in perfect plumage: one from the Valley of Cashmere, the other from The Lolab, Cashmere, at 8,000 feet. "Upper

mandible horny brown at base, tip yellow; lower mandible yellow; feet dull olive; iris in two zones, inner zone red, outer pinkish white. Length of male. 13½ inches; female, 14 inches."

Family ALAUDIDÆ.

CALANDRELLA ACUTIROSTRIS Hume.

Calandrella acutirostris HUME, Lahore to Yarkand, 1873, p. 265.

Two specimens, from Bazgo plain, Ladak, 11,000 feet. "Iris dark brown; bill dark horn-brown above, yellowish at base beneath; feet brownish fleshy; claws pale horn-brown. Common on this plain, in pairs." These examples are identical with those previously collected by Dr. Abbott in Ladak and Tagdumbash Pamir but recorded by Dr. Richmond as *tibetana*.[1]

From *Calandrella brachydactyla* and *dukhunensis* both *acutirostris* and *tibetana* may readily be distinguished by the absence of deep buffy tinge in the edgings of the exterior webs of the outermost tail-feathers. Aside from the shape of the bill, a differential character apparently quite unreliable by reason of the great range of individual variation, *tibetana* may be separated from *acutirostris* by the pattern of the outer pair of tail-feathers. In the former species the whole feather is white excepting the basal third of the inner web and the extreme base of the outer, which are obliquely blackish; in *acutirostris* the inner web of the outer tail-feathers is largely blackish, the white occupying a diagonally terminal area equal to only about a fourth of the inner vane and one-half the outer. Dr. Richmond's inability satisfactorily to distinguish from *tibetana* the specimens he records as *acutirostris*[2] is explained by the fact that he had no examples of *tibetana*, those with which he made his comparison as such being all *acutirostris*.

ALAUDA ARVENSIS LEIOPUS (Hume).

Alauda leiopus HUME, Stray Feathers, I, November, 1872, p. 40.

Two breeding males from Shooshot, Indus Valley, Ladak, at 10,000 feet. Dr. Abbott reports them as "very common in the cultivated fields." These specimens do not differ from those obtained by Dr. Abbott in Cashmere.

Owing to the unfortunate confusion which at present exists among the races of *Alauda arvensis*, any determination must of necessity be largely tentative; but so far as our series is indicative, the birds from eastern Asia are larger and have more slender bills than those from Cashmere and Ladak, the difference being apparently sufficient to warrant subspecific separation. Dr. Richmond used the name *Alauda*

[1] Proc. U. S. Nat. Mus., XVIII, 1896, pp. 467, 579.
[2] Idem., p. 579.

arvensis intermedia (Swinhoe)[1] for this race, considering it not to differ from the bird of eastern Asia, but stating that in the event of their separation the name *guttata* of Brooks would be the proper one for the Cashmere form, since *Alauda leiopus* of Hodgson[2] is a *nomen nudum*. Mr. Hume, however, in an article on the skylarks of India differentiates "the *Leiopus* type from Ladak, Thibet, and the higher Himalayan plateau generally;"[3] giving a diagnosis, and identifying his bird—which he regards as the breeding form of the region mentioned—with *leiopus* of Hodgson. As Hume's name antedates *A. guttata* of Brooks, and since it is a perfectly tenable one, notwithstanding the unavailability of *A. leiopus* Hodgson, the skylark of Cashmere and Ladak should be called *Alauda arvensis leiopus* (Hume).

OTOCORIS LONGIROSTRIS Moore.

Otocorys longirostris MOORE, Proc. Zool. Soc. Lond., 1855, p. 215, pl. CXI (from the Gould manuscript).

Three breeding birds from Ladak, taken, respectively, at Fotu-la Pass, 13,000 feet; Debring, Rupshu, 16,000 feet, and Tsokr Chumo Lake. Male: "Bill black, leaden beneath at base." Female: "Feet black, soles pale; bill dark horny, pale bluish horny beneath at base."

Family ENICURIDÆ.

ENICURUS MACULATUS Vigors.

Enicurus maculatus VIGORS, Proc. Zool. Soc. Lond., 1830, p. 9.

One handsome adult male, from Sind Valley, Cashmere, taken December 17, 1895, at 6,000 feet altitude. "Iris dark brown; feet and claws white; bill black; length, $10\frac{7}{8}$ inches."

Family CRATEROPIDÆ.

TROCHALOPTERON VARIEGATUM SIMILE (Hume).

Trochalopteron simile HUME, Ibis, 1871, p. 408.

Six specimens, from The Lolab and Lolab Valley, Cashmere, all taken at an altitude of 8,000 feet. They are exceedingly uniform in color, and present very strongly the subspecific characters of *simile*, the outer portions of the wing-quills and tail-feathers being clear gray with scarcely a suggestion of olive. "In length they range from 10 to $10\frac{1}{2}$ inches. Iris green; feet pale fleshy brown, or [in some] pale orange-brown; bill black."

[1] Proc. Zool Soc. Lond., 1863, p. 89.
[2] Icon. ined. in Brit. Mus., Passeres, pl. 293 (No. 728).
[3] Stray Feathers, I, November, 1872, p. 40.

Family ACCENTORIDÆ.

ACCENTOR HIMALAYANUS Blyth.

Accentor himalayanus BLYTH, Journ. As. Soc. Beng., XI, 1842, p. 187.
Accentor altaicus BRANDT, Bull. Acad. St. Pétersb., I, 1843, p. 365.

One young male, from Mya, on the Indus River, Ladak, at 13,000 feet.

This bird is in first plumage, though wings and tail are full grown, and may be described as follows: Upper surface dull buffy ochraceous, rather more ashy on nape, darker on back; everywhere, except on upper tail-coverts, mottled with darker, these markings largest on back, duller and smaller on head and hind neck; tail fuscous, edged externally with chestnut; wings fuscous, with broad margins of chestnut, the wing-coverts tipped with ochraceous; sides of head and neck dull brown mixed with ochraceous; a poorly indicated superciliary stripe of buffy; chin buff, speckled with dusky; throat pale dull buff, thickly marked with blackish; breast and jugulum deep ochraceous, streaked with blackish; remainder of under surface plain buffy. "Length, 6½ inches."

Though commonly known as *Accentor altaicus*, there seems to be no reason why the earliest name for this bird, *Accentor himalayanus* Blyth, should not be employed, since the original description is clearly pertinent enough to be tenable.

Family TURDIDÆ.

SAXICOLA PICATA CAPISTRATA (Gould).

Saxicola capistrata GOULD, Birds Asia, 1865, Pt. 17.
Saxicola picata capistrata RICHMOND, Proc. U. S. Nat. Mus., XVIII, 1896, p. 480.

One adult male from Kargil, Ladak, taken June 23, 1897, at 8,000 feet altitude. "Bill and feet black." This bird is in rather worn plumage, particularly on the head, but is apparently quite a typical specimen. Intergradation with true *picata* makes necessary the trinomial designation here employed.

SAXICOLA OREOPHILA, new name.

Saxicola montana GOULD, Birds Asia, 1865, Pt. 17 (nec Koch).

Seven specimens, all from localities in Ladak. Two of the three breeding males are from Gya, at 15,000 feet; the other is from Debring, Rupshu, at 16,000 feet, and all are in worn condition. An October male from Nurla, in the Indus Valley, at 10,000 feet, is in freshly molted plumage, and, besides having the black areas obscured by light tips to the feathers, is elsewhere on the body strongly tinged with isabella color, this particularly evident on the lower back, upper tail-coverts,

and under surface. Two of the three breeding females are from Gya, at 13,000 and 15,000 feet, respectively, and though in every other respect typical, have the throat and sides of the neck, not including the chin, dull brownish black, somewhat mixed with buffy, instead of the ordinary dull buffy. The third female is from Tsokr Chumo Lake, at 15,000 feet altitude; the collector's note on the label, "bill, feet, and claws black," is applicable to both males and females.

The name *Saxicola montana* Gould, currently used for this stone chat, is preoccupied by *Saxicola montana* Koch,[1] which is *Monticola saxatilis* Linnæus; and as there are no synonyms, the new name above given becomes necessary.

PHŒNICURUS ERYTHRONOTUS (Eversmann).

Sylvia erythronota EVERSMANN, Add. Pallas' Zoogr. Rosso-As., II, 1841, p. 11.
Phœnicurus erythronotus RICHMOND, Proc. U. S. Nat. Mus., XVIII, 1896, p. 482.

One female in perfect fall plumage, from the Valley of Cashmere. "Bill and feet black."

PETROPHILA CYANA (Linnæus).

Turdus cyanus LINNÆUS, Syst. Nat., 12th ed., I, 1766, p. 296.

One adult male, in every respect apparently typical of this form, from Saspul, Indus Valley, Ladak, at 10,000 feet. "Bill, feet, and claws black; inside of mouth yellow." The specimens recorded by Dr. Richmond in his paper on Cashmere birds[2] were, by inadvertence, entered as *Petrophila solitaria*.

The very long wings appear sufficiently to distinguish the genus *Petrophila* from *Monticola*.

MOTACILLA ALBOIDES Hodgson.

Motacilla alboides HODGSON, Asiat. Researches, XIX, 1836, p. 191.
Motacilla hodgsoni HODGSON, in Gray's Zool. Misc., 1844, p. 83 (from the Blyth manuscript).

Three specimens. Two of these, an adult male and female in breeding plumage, are from Saspul, Indus Valley, Ladak, at 10,000 feet. Dr. Abbott's notes are: "Iris dark brown; bill and feet black. The commonest wagtail hereabouts. In pairs; often on stony hillsides quite a distance from water." The third example is a winter male, with white chin, taken in the Valley of Cashmere. "Length, 7⅞ inches."

Mr. Hodgson's *Motacilla alboides* has priority over the same author's *M. hodgsoni*, and as his original description of *alboides* without doubt applies to the present species, the name should be adopted.

[1] System der Baiern. Zoologie, 1816, p. 185.
[2] Proc. U. S. Nat. Mus., XVIII, 1896, p. 488.

Family SYLVIIDÆ.

PHYLLOPSEUSTES HUMEI (Brooks).

Reguloides humei BROOKS, Stray Feathers, VII, 1878, p. 131.
Phyllopseustes humii RICHMOND, Proc. U. S. Nat. Mus., XVIII, 1896, p. 476.

One specimen from Leh, Ladak, 11,000 feet. "Length, 4⅝ inches." This is a fall bird, differing from a similar example from the Thian Shan Mountains in being more brownish on the head, rump, and under parts, this probably an indication of immaturity.

PHYLLOPSEUSTES AFFINIS (Tickell).

Motacilla affinis (err. typ.) TICKELL, Journ. As. Soc. Beng., II, 1833, p. 576.
Phyllopseustes affinis RICHMOND, Proc. U. S. Nat. Mus., XVIII, 1896, p. 475.

One example, September 11, 1897, from Mya, Indus River, at 12,500 feet, is probably a bird of the year. The entire body plumage is noticably paler than in two breeding birds from Cashmere.

PHYLLOPSEUSTES TRISTIS (Blyth).

Phylloscopus tristis BLYTH, Journ. As. Soc. Beng., XII, 1843, p. 966.
Phyllopseustes tristis MEVES, Journ. für Orn., 1875, p. 430.

Two perfectly typical breeding males; from Nimu, Indus Valley, and Shergol, Ladak, respectively, both taken at an altitude of 10,000 feet. "Feet brownish black; bill black, fleshy horn brown at base beneath."

Family CINCLIDÆ.

CINCLUS ASIATICUS Swainson.

Cinclus asiaticus Swainson, Faun. Bor.-Amer., II, 1831, p. 174.

One example, from the Sind River, Cashmere, taken at 6,000 feet. "Length, 8⅝ inches." Not in any way different from Ladak specimens.

The name *Cinclus asiaticus* Swainson, as above cited, is a *nomen nudum*; but as there remains some doubt about the proper designation of the species, no change is here made.

CINCLUS CINCLUS CASHMERIENSIS (Gould).

Cinclus cashmeriensis GOULD, Proc. Zool. Soc. Lond., 1859, p. 474.
Cinclus cinclus cashmeriensis RICHMOND, Proc. U. S. Nat. Mus., XVIII, 1896, p. 488.

One specimen, from Gya, Ladak, at 13,000 feet. "Front of tarsi and top of toes lead color, rest of feet dull black; bill black. Length, 8 inches." The head and cervix are of a warmer brown than in winter specimens, and the feathers of the flanks and sides lack entirely the whitish edgings of the latter season.

Family FRINGILLIDÆ.

EMBERIZA CIA Linnæus.

Emberiza cia LINNÆUS, Syst. Nat., 12th ed., I, 1766, p. 310.

Two specimens from Lamayuru, Ladak, taken June 26, 1897, at 12,000 feet altitude. "Bill black, leaden beneath at base; feet pale fleshy brown, with a reddish tinge; claws dark horn brown.—Common on the bare stony hillsides and about villages up to 13,000 feet; always in pairs at this season."

These birds are typical *cia*, not *stracheyi*, which Dr. Richmond surmised[1] to be the breeding form of the region.

EMBERIZA LEUCOCEPHALA Gmelin.

Emberiza leucocephalos GMELIN, Nov. Comm. Acad. Sci. Imp. Petrop., XV, 1771, p. 480, pl. XXIII, fig. 3.

A pair of winter birds from the Valley of Cashmere. "Upper mandible dark horny brown, lower mandible horny blue; feet pale fleshy brown. Length of male, 7⅛ inches; female, 6¾ inches."

CARPODACUS SEVERTZOVI Sharpe.

Carpodacus severtzovi SHARPE, Proc. Zool. Soc. Lond., 1886, p. 354.

Two breeding specimens from Upshi, Valley of the Indus, Ladak, at 11,000 feet. "Iris brown; bill pale brownish horny above, whitish horny beneath; feet in male black, in female dark fleshy brown." Dr. Abbott notes that he found the species "in pairs on the stony hillsides."

CARPODACUS ERYTHRINUS (Pallas).

Loxia erythrina PALLAS, Nov. Comm. Acad. Sci. Imp. Petrop., XIV, Pt. 1, 1770, p. 587, pl. XXIII, fig. 1.
Carpodacus erythrinus GRAY, Gen. Birds, II, 1844, p. 384.

One male from Tashgam, Ladak. "Iris brown; upper mandible horny brown, lower mandible dull yellowish horny; feet fleshy brown; claws horn brown."

From the specimens available it is indicated that the birds of this region are entitled to subspecific recognition by reason of their decidedly brighter colors; but this material is too meager to justify a formal separation.

SERINUS PUSILLUS (Pallas).

Passer pusillus PALLAS, Zoogr. Russo-Asiat., II, 1826, No. xliii, p. 28.
Serinus pusillus BRANDT, Bull. Sci. Acad. St. Pétersb., I, 1843, p. 366.

Two examples, from Shooshot and from Shergol, Indus Valley, Ladak, respectively, both taken at an altitude of 10,000 feet. "Iris

[1] Proc. U. S. Nat. Mus., XVIII, 1896, p. 465.

dark brown; bill brownish black; feet dull blackish. In flocks of 10 or 12, feeding on ground on bare, stony hillsides."

These specimens agree perfectly with other adults, except that the bright patch on the forehead is orange instead of scarlet, a condition very probably due to the abrasion incident to the breeding season.

PASSER DOMESTICUS INDICUS (Jardine and Selby).

Passer indicus JARDINE and SELBY, Ill. Orn., III, October, 1831, pl. 118.
Passer domesticus indicus SEEBOHM, Ibis, 1883, p. 8.

Two breeding specimens from Fotu-la Pass, Ladak, at an altitude of 12,000 feet.

LEUCOSTICTE BRANDTI Bonaparte.

Leucosticte brandti BONAPARTE, Consp. Av., I, 1850, p. 537.

Three summer specimens from Ladak: two of these are from below the Kazuri-la, Ladak, at 16,000 feet, where Dr. Abbott reports the species as occurring in small flocks on grassy areas; the third individual is from Gya, Ladak, at 14,000 feet. "Bill and feet black; iris dark brown."

MONTIFRINGILLA ALTAICA (Eversmann).

Fringilla altaica EVERSMANN, Bull. Naturforsch. Gesellsch. Moscau, XXI, 1848, p. 219.
Fringillauda sordida STOLICZKA, Journ. As. Soc. Beng., XXXVII, 1868, p. 63.

One specimen from The Lolab, Cashmere. "Feet brownish black; iris pale brown."

An examination of the original description of Eversmann's *Fringilla altaica*, which Dr. Sharpe stated[1] that he was unable to discover, proves beyond a doubt what was long ago affirmed by Severtzoff[2]—the priority of the name *altaica* for the species commonly called *Montifringilla sordida* (Stoliczka). Eversmann gives the southern Altai Mountains, "Umgegend des Dorfes Uimon" as the locality; and his diagnosis is as follows: "*F. rostro crasso conico; gastræo fusco-cinereo, concolore; notæo fusco-liturato, capite ferruginoso; rectricibus nigricantibus concoloribus, tectricibus caudæ superioribus apice lato albo.*" Mention also is made of affinity to *Leucosticte arctoa* and *Fringilla montifringilla*.

MONTIFRINGILLA ADAMSI Adams.

Montifringilla adamsi ADAMS, Proc. Zool. Soc. Lond., 1858, p. 482 (from the Moore manuscript).

Three examples from Ladak: Fotu-la Pass, 12,000 feet; Upshi, Indus Valley, 11,000 feet; and Phyang, Indus Valley, 11,000 feet. "Iris yellowish brown; bill, feet, and claws black."

[1] Cat. Birds Brit. Mus., XII, 1888, p. 266 (footnote).
[2] Stray Feathers, III, 1875, p. 424; Ibis, 1883, p. 60.

LINARIA BREVIROSTRIS PYGMÆA (Stoliczka).

Linota pygmæa STOLICZKA, Journ. As. Soc. Bengal, XXXVII, Pt. 2, 1868, p. 62.

Five summer birds from Gya, Ladak, at from 13,000 to 14,000 feet. According to Dr. Abbott's notes the color of the feet ranges from "dark fleshy brown" to black; and the bill is variously "pale brownish fleshy," "dull leaden," or "horny white," always "dark brown at tip." "Length, male, 5⅝ inches." With regard to their habits he states: "In small flocks about the patches of cultivation and picking among the horse droppings in the road."

These five specimens are exceedingly interesting, since they establish beyond a doubt the validity of *Linota pygmæa* Stoliczka, a form which has heretofore always been synonymized with *L. brevirostris*. Even casual comparison is sufficient to show that the two are at least subspecifically distinct. The original specimens of *pygmæa* came from Chini and Padam, so that this form seems to be confined chiefly to Ladak; *L. brevirostris* apparently occupying the region extending from Asia Minor to Turkestan. The original wing measurement is smaller than that of the present examples, but, excepting this and a few other unimportant discrepancies, the original description of *Linota pygmæa* is perfectly applicable.

From Turkestan and Tagdumbash Pamir specimens, which are assumed to be nearly or quite typical *brevirostris*, *pygmæa* differs in being much darker, more fulvous throughout, this being most evident on jugulum, breast, and back. One individual is rather paler than the others, thus in a measure verging toward *brevirostris* and indicating its subspecific relationship, but is without difficulty distinguishable.

The proper generic name for the linnets is apparently *Linaria* Bechstein,[1] this being almost thirty years prior to to *Linota* Bonaparte[2] which has been in frequent use for the group. Dr. Sclater, after showing *Linaria* to be the earliest name,[3] rejects it on account of previous employment in botany,[4] a course not in accord with current usage.

CALLACANTHIS BURTONI (Gould).

Carduelis burtoni GOULD, Proc. Zool. Soc. Lond., 1837, p. 90.
Callacanthis burtoni BONAPARTE, Consp. Av., I, 1850, p. 507.

One adult male, December 16, 1895, from Sind Valley, Cashmere, at 6,000 feet, differs from breeding males in the duller, more rosaceous tinge of the lower surface. "Bill horny yellow, brown at tip; feet pale brownish flesh color. Length, 7⅛ inches."

[1] Ornith. Taschenb., I, 1802, p. 121.
[2] Saggio Distr. Met. Anim., 1831, p. 141.
[3] Ibis, 1892, pp. 555 et seq.
[4] Idem., p. 557.

PERISSOSPIZA[1] ICTERIOIDES (Vigors).

Coccothraustes icterioides VIGORS, Proc. Zool. Soc. Lond., 1830, p. 8.
Pycnorhamphus icteroides HUME, Nests and Eggs Indian Birds, 1874, p. 469.

One adult male in perfect plumage, from Sind Valley, Cashmere, at 6,000 feet. "Iris hair brown; feet fleshy pink; claws horny brown; bill green, slightly yellowish. Length, 9⅛ inches."

The generic term *Pycnorhamphus* Hume,[2] commonly applied to this and two allied species, is preoccupied by *Picnoramphus* Rosenberg,[3] a synomym of *Sphecothera* Vieillot,[4] the difference in the spelling of the two names being simply one of transliteration. Since for *Pycnorhamphus* there is no other name available, it may be called as above—*Perissospiza*, from περισσός, mirabilis, and σπίζα, fringilla. The remaining species of this genus will consequently stand as *Perissospiza affinis* (Blyth) and *Perissospiza carneipes* (Hodgson).

Family HIRUNDINIDÆ.

PTYONOPROGNE RUPESTRIS (Scopoli).

Hirundo rupestris SCOPOLI, Ann. I. Hist. Nat., 1769, p. 167.
Ptyonoprogne rupestris REICHENBACH, Syst. Av., 1850, pl. LXXXVII, fig. 6.

One specimen, June 29, 1897, from Spittak, Indus Valley, Ladak, at 10,000 feet. "Feet pale brownish fleshy; iris blackish brown; claws horn brown; bill dull black." With a fair series of both Asiatic and European specimens at hand, no difference worthy of subspecific recognition is apparent.

The generic term *Biblis*,[5] commonly applied to the crag martins when they are distinguished from *Riparia* (=*Cotile*), is ineligible for use in this connection, being preoccupied in Lepidoptera by *Biblis* Fabricius.[6] The next available name is *Ptyonoprogne* Reichenbach,[7] which should therefore stand as the proper designation of the group.

DELICHON CASHMERIENSIS (Gould).

Chelidon cashmeriensis GOULD, Proc. Zool. Soc. Lond., 1858, p. 356.

Two specimens, taken July 4, 1897, at Upshi, Indus Valley, Ladak, 11,000 feet. "Iris dark brown; claws horn brown; bill black." Dr. Abbott notes that one of these examples belonged to a large colony which was nesting in a bluff of conglomerate on the banks of the Indus.

As Dr. Reichenow has already demonstrated,[8] the generic term *Cheli-*

[1] New name for *Pycnorhamphus*.
[2] Nests and Eggs of Indian Birds, 1874, p. 469.
[3] Batavia Natur. Tijdschr. Nederl. Ind., XXIX, 1866, p. 143.
[4] Nouv. Dict. d'Hist. Nat., XXXII, 1819, p. 5.
[5] Lesson, Compl. Buff., VIII, 1837, p. 495.
[6] Illiger's Mag., VII, 1807, p. 281.
[7] Syst. Av., 1850, pl. LXXXVII, fig. 6.
[8] Journ. f. Orn., 1889, p. 187.

don,[1] commonly employed for this and allied species, is clearly untenable, being preoccupied by *Chelidon* Forster,[2] which is a synonym of *Hirundo* Linnæus. *Delichon* Moore[3] was proposed for the bird now known as *Chelidon nipalensis*, but as this species appears to be not generically distinct from *C. urbica* and its allies, the generic name *Delichon* must be used for all. The only alternative is to restrict *Delichon* to *nepalensis* and use *Chelidonaria* Reichenow[4] for the *urbica* group.[5]

Family PARIDÆ.

ÆGITHALISCUS NIVEOGULARIS (Moore).

Orites (?) nivcogularis MOORE, Proc. Zool. Soc. Lond., 1854, p. 140 (from the Gould manuscript).
Ægithaliscus niveogularis JERDON, Birds Ind., II, 1863, p. 272.

Four specimens of this handsome species, from the Sind Valley, Cashmere, at 6,000 feet. "Length, from $4\frac{1}{2}$ to $4\frac{3}{4}$ inches," the female being slightly smaller. "Iris dark brown; feet orange brown; bill black."

Family STURNIDÆ.

STURNUS VULGARIS MENZBIERI (Sharpe).

Sturnus menzbieri SHARPE, Ibis, 1888, p. 438.
Sturnus vulgaris menzbieri RICHMOND, Proc. U. S. Nat. Mus., XVIII, 1896, p. 573.

Two specimens from the Valley of Cashmere. "Iris blackish brown; feet dark purplish brown; bill black. Length of male, 9 inches; of female, $8\frac{5}{8}$ inches." This is apparently an easily distinguishable race.

Family CORVIDÆ.

TRYPANOCORAX FRUGILEGUS (Linnæus).

Corvus frugilegus LINNÆUS, Syst. Nat., 10th ed., I, 1758, p. 105.
Trypanocorax frugilegus LOCHE, Explor. Sci. Algér., Ois., I, 1858, p. 113.

Two adult males from the Valley of Cashmere, taken respectively on December 24 and 27, 1895.

CORVUS CORAX Linnæus.

Corvus corax LINNÆUS, Syst. Nat., 10th ed., I, 1758, p. 105.

One male, from the Hanlé River, Rupshu, Ladak, at 15,000 feet. "Length, $26\frac{1}{2}$ inches."

[1] Boie, Isis, 1822, p. 550.
[2] Synop. Cat. Brit. Birds, 1817, p. 17.
[3] Proc. Zool. Soc. Lond., 1854, p. 104.
[4] Journ. f. Orn., 1889, p. 187.
[5] Reichenow, Ornith. Monatsb., 1899, p. 81.

NOTES ON SOME BIRDS FROM SANTA BARBARA ISLANDS, CALIFORNIA.

By HARRY C. OBERHOLSER,
Assistant Biologist, Department of Agriculture.

During the spring and summer of 1892, Mr. Clark P. Streator, under the auspices of the Biological Survey of the Department of Agriculture, made a small collection of birds upon the Santa Barbara Islands, California. Of these specimens, which are now in the United States National Museum as part of the Biological Survey collection, the writer has been able, through the kindness of Dr. C. Hart Merriam, to prepare the subjoined list. The new forms obtained by Mr. Streator have already been described; so it remains only to record the species collected, with the addition of various critical notes upon those of special interest.

The islands visited by Mr. Streator, with inclusive dates of his collecting, are as follows:

Santa Catalina Island, April 9 to 29.
San Miguel Island, June 24 to 29.
Santa Rosa Island, July 1 to 3.
Santa Cruz Island, July 9 to 20.

PUFFINUS GRISEUS (Gmelin).

A single specimen, taken July 3, in the Santa Barbara Channel, is in the collection.

LOPHORTYX CALIFORNICUS VALLICOLA (Ridgway).

One male and one female from Santa Catalina Island. They seem rather darker and more ochraceous than extreme examples of *vallicola*, but are identical with birds from the San Joaquin Valley. The species has probably been introduced from the mainland.

COLAPTES CAFER (Gmelin).

An immature specimen from Santa Cruz Island apparently does not differ from birds of the adjacent mainland, though the material at hand for comparison is not entirely satisfactory.

SELASPHORUS ALLENI Henshaw.

Two adult males in perfect plumage, from Santa Catalina Island are identical with Nicasio birds.

SAYORNIS NIGRICANS (Swainson).

Three birds from Santa Cruz Island are all immature, with rufous edgings to the feathers of lower back, under wing-coverts and all the upper series; the innermost secondaries are also margined with a paler shade of the same. Two adults taken on Santa Rosa Island add the species to the fauna of this island.

EMPIDONAX INSULICOLA Oberholser.

Five specimens; from Santa Rosa, Santa Cruz, and Santa Catalina islands; all mentioned in the original description of the species.[1] Since that was published, the writer, through the courtesy of Mr. Joseph Grinnell, has examined specimens from San Clemente Island, which are substantially identical with those from the other islands.

OTOCORIS ALPESTRIS INSULARIS Townsend.

Twelve examples from San Miguel Island and one from Santa Rosa are all in more or less worn plumage, but even in this condition exhibit the distinctive characteristics of this insular race.

APHELOCOMA INSULARIS Henshaw.

A fine series of twelve adults and five immature specimens serves very strongly to emphasize the distinctness of this species from both of its mainland relatives. Not only are its characters very pronounced, but among perfectly comparable examples there is relatively little individual difference either in size or color. Many of the adults are strongly tinged with brownish below, but this is undoubtedly an adventitious stain, as it is absent on feathers of the fresh plumage. All the adults are in process of molt and exhibit almost every stage of feather renewal. The immature birds are all in "first" plumage, just beginning to change into perfect dress, and differ little from each other. The plumage of the young, which seems never to have been described, is as follows:

Above chocolate brown, shading into dull dark blue on crown and upper tail-coverts, the transition on latter rather abrupt; wings and tail as in the adult; sides of head and neck blackish brown; a short whitish line over each eye, the only indication of a superciliary; chin, throat, and center of jugulum brownish white, the sides of jugulum and an almost complete collar on breast dull blackish brown; remainder of breast and abdomen smoke gray; crissum dark slate gray; thighs light brown.

[1] Auk, XIV, 1897, p. 300.

CORVUS CORAX SINUATUS (Wagler).

One individual from Santa Catalina Island appears to be indistinguishable from typical specimens.

STURNELLA NEGLECTA Audubon.

Two specimens from San Miguel Island, one of them a female in the spotted and mottled plumage of the young. The other, an adult male in rather worn condition, seems not to differ from *neglecta* of the mainland.

It seems remarkable that anyone who has ever heard the striking vocal performances of the western meadowlark should consider it a subspecies of the eastern bird. And when there is taken into account the fact that over a large area the breeding ranges of the two overlap, the birds there remaining as distinct as elsewhere, and that the supposed intermediate specimens ultimately resolve themselves into seasonal or some other equally nonpertinent variation, the rational course would appear to be the recognition of *Sturnella neglecta* as a full species.

CARPODACUS MEXICANUS CLEMENTIS (Mearns).

Fourteen specimens, from Santa Catalina, San Miguel, and Santa Cruz islands, are referable to this new race. The males differ much among themselves in the shade of the red on throat and breast, as well as in the extent and intensity of the red suffusion on the anterior upper surface, in some individuals this color being confined almost entirely to the crown. There is also a considerable range of variation in dimensions, inclusive of the bill, size being but an average subspecific distinction. The specimens examined are darker above than *obscurus* (= *frontalis*),[1] a character not mentioned by Dr. Mearns in his original diagnosis.[2]

Birds in the juvenal plumage are much more ochraceous, particularly above, than adult females, and seem to be rather darker than the young of *obscurus*. This plumage of *clementis* appears not to have been described, and the following is therefore added, from a male shot on Santa Cruz Island, July 18:

Above dull brown, rather darker on the back, all the feathers with ochraceous margins, these imparting a somewhat streaked appearance; rump and upper tail-coverts almost plain deep ochraceous; wings and tail fuscous, edged with buffy, the wing-coverts and innermost secondaries margined with ochraceous; lores and subocular region buffy whitish; sides of head and neck ochraceous, streaked with dull brown; under surface dull white, washed with ochraceous and everywhere streaked with dull brown; crissum buffy ochraceous, with narrow shaft markings of brown.

[1] See Oberholser, Auk, XVI, 1899, p. 186.
[2] Auk, XV, 1898, p. 259.

ZONOTRICHIA LEUCOPHRYS GAMBELI (Nuttall).

A pair of adults from Santa Catalina Island. This is the race formerly known as *intermedia*.[1]

SPIZELLA SOCIALIS ARIZONÆ Coues.

Three specimens. Two of these are adults from Santa Catalina Island, and are in color and in most of their measurements apparently like the mainland form. The wings are, however, somewhat shorter, but the difference seems too slight to warrant the separation of the island bird. The third specimen, which is in the spotted plumage of the young, is from Santa Rosa, and appears to be the first record of the species for this island.

MELOSPIZA MELODIA CLEMENTÆ (Townsend).

Eighteen specimens, including both adults and young, from the islands of San Miguel and Santa Rosa. The adults are in worn plumage, but agree with examples from San Clemente Island, the type locality of this race. The young exhibit much more individual variation than the adults, but on the whole present quite as good characters for subspecific distinction. This juvenal stage, as is usual among the song sparrows, is quite different in appearance from the adult, and may be described as follows:

Above brownish gray, somewhat rufescent on the rump, the feathers with deep brown or blackish centers, these broadest on back, where they are margined conspicuously with pale grayish; head with no evident median stripe; wings and tail about as in the adult; sides of head and neck dull buffy white, considerably mixed with brown; lower parts dull buffy white; jugulum, sides of throat and body, with short streaks of brownish gray, less evident on the last.

The species appears not to have been previously recorded from San Miguel Island.

MELOSPIZA LINCOLNII (Audubon).

A single adult female from Santa Catalina Island. The upper surface is rather more than usually tinged with ochraceous, as are also the posterior lower parts, thus almost obliterating the definition of the pectoral band.

PASSERELLA ILIACA INSULARIS Ridgway.

One adult from Santa Catalina Island.

PASSERELLA ILIACA MEGARHYNCHA (Baird).

Three typical examples from Santa Catalina Island.

[1] For change of name, see Ridgway, Auk, XVI, 1899, p. 36.

PASSERELLA ILIACA STEPHENSI Anthony.

Although not recorded from any of the islands of the Santa Barbara group, three specimens from Santa Catalina Island are undoubtedly referable to this race, being of course migrants from the mainland, as all the other forms of *Passerella* seem to be. Two of these individuals are quite typical, the other verging somewhat toward *megarhyncha*. All have a considerable tinge of brown over the entire upper surface.

PIPILO MACULATUS CLEMENTÆ (Grinnell).

Three examples from Santa Cruz Island, with one from Santa Rosa, are in color like *clementæ*, but differ in their somewhat smaller size. A single bird in juvenal plumage is very little different from the similar stage of *megalonyx*. Seven adults from Santa Catalina Island are intermediate between *clementæ* and the mainland coast form (*P. m. atratus*) recently described by Mr. Ridgway, but seem to be nearer the former.

LANIUS LUDOVICIANUS ANTHONYI Mearns.

A single specimen in juvenal plumage is darker above than even *ludovicianus* of similar age.

HELMINTHOPHILA CELATA SORDIDA Townsend.

Eight males and two females were collected, all on Santa Catalina Island. This fine series bears out the characters assigned by Mr. Townsend, but shows also that these differences are not entirely constant. The olivaceous wash on the flanks is one of the best distinctions.

MIMUS POLYGLOTTOS (Linnæus).

Three examples from Santa Catalina Island show considerable individual variation in the shade of the upper surface, but appear to be absolutely indistinguishable from birds of the extreme eastern United States. They are quite brownish both above and below, but this is evidently due to wear or stain, perhaps to both.

SALPINCTES OBSOLETUS (Say).

The single specimen is from San Miguel Island and is not satisfactorily distinguishable from mainland specimens.

THRYOMANES BEWICKII CHARIENTURUS Oberholser.

Five examples from Santa Catalina Island. The slight and very inconstant differences presented by the birds from this island as compared with typical *charienturus* have been already fully set forth in a previous paper,[1] and therefore need not be repeated here.

[1] Proc. U. S. Nat. Mus., XXI, 1898, p. 436.

THRYOMANES BEWICKII NESOPHILUS Oberholser

Ten specimens, from Santa Cruz and Santa Rosa islands. All these were recorded in the writer's recent paper on the genus.[1] Since the appearance of that article additional material from Santa Cruz Island has been examined, substantiating former conclusions with regard to the validity of this form. It is certainly different enough from both *charienturus* and *drymœcus* to warrant recognition as a subspecies. Two young birds from Santa Rosa are somewhat paler above than the young from Santa Cruz Island.

HYLOCICHLA AONALASCHKÆ (Gmelin).

One perfectly typical female from Santa Catalina Island.

[1] Proc. U. S. Nat. Mus., XXI, 1898, p. 443.

CATALOGUE OF A COLLECTION OF BIRDS FROM MADAGASCAR.

By HARRY C. OBERHOLSER,
Assistant Biologist, Department of Agriculture.

During a period of some eighteen months, extending from July, 1894, to February, 1896, the Rev. James Wills formed a small collection of birds in Madagascar. He worked chiefly in Imerina, in the east central part of that island, most of the specimens coming from the various forests in the more or less immediate vicinity of that locality. These birds, numbering 110 and referable to 57 species, were eventually purchased by the United States National Museum. In the list which follows, the presence of the rare *Lophotibis cristata* and the little known *Ardeola xanthopoda* seems worthy of note. Pertinent remarks on the colors of the soft parts, which, whenever available, are added from the labels of the specimens, will be found between quotation marks

Family COLYMBIDÆ.

COLYMBUS PELZELNII (Hartlaub).

Podiceps pelzelnii HARTLAUB, Faun. Madagasc., 1861, p. 83.

One adult, apparently in breeding plumage, from East Imerina, December, 1894.

The specimen collected by Dr. Abbott on the River Mangoro, Madagascar, and recorded by Dr. Richmond[1] as *Colymbus pelzelnii*, proves to be not this species at all, but *Colymbus capensis* (Lichtenstein)

Family SCOLOPACIDÆ.

ACTITIS HYPOLEUCA (Linnæus).

Tringa hypoleucos LINNÆUS, Syst. Nat., 10th ed., I, 1758, p. 149.
Actitis hypoleucos ILLIGER, Prodr., 1811, p. 262.

One apparently immature bird from East Imerina, taken in February, 1896.

[1] Proc. U. S. Nat. Mus., XIX, 1897, p. 677.

Family RALLIDÆ.

GALLINULA CHLOROPUS PYRRHORRHOA (Newton).

Gallinula pyrrhorrhoa A. NEWTON, Proc. Zool. Soc. Lond., 1861, p. 19.
Gallinula chloropus pyrrhorrhoa SIBREE, Ibis, 1892, p. 114.

One specimen, April, 1895, from "between the two forests," East Madagascar.

The ochraceous crissum seems to warrant at least the subspecific separation of the Madagascan form of *Gallinula chloropus*, although the occasional presence of this character in the typical bird indicates the inadvisability of according *pyrrhorrhoa* specific rank.

Family ANATIDÆ.

NETTION PUNCTATUM (Burchell).

Anas punctata BURCHELL, Travels S. Africa, I, 1822, p. 283 (note).
Nettion punctatum SALVADORI, Cat. Birds Brit. Mus., XXVII, 1895, p. 265.

Two specimens, seemingly male and female, though unsexed. The supposed female is of generally duller plumage than the male; the spots on neck, throat, jugulum, breast, flanks, and sides are larger and less sharply defined; the sides, together with the upper and lower tail coverts, lack almost entirely the wavy cross lines; and the inner secondaries are only very slightly glossed with greenish.

SAROTHRURA INSULARIS (Sharpe).

Corethrura insularis SHARPE, Proc. Zool. Soc. Lond., 1870, p. 400.
Sarothrura insularis STONE, Proc. Acad. Nat. Sci. Phila., 1894, p. 148.

Two examples from East Imerina. One is apparently an immature male, differing from the adult of the same sex in the presence of much brownish olivaceous admixture on the posterior portion of the lower surface.

DRYOLIMNAS CUVIERI (Pucheran).

Rallus cuvieri PUCHERAN, Rev. et Mag. de Zool., 1845, p. 279.
Dryolimnas cuvieri SHARPE, Bull. Brit. Orn. Club, II, January, 1893, p. xxviii.

One male, apparently adult, from the Mampidongy Forest, East Imerina, February, 1896. "Native name, Tsikia. Iris reddish brown."

Family IBIDIDÆ.

LOPHOTIBIS CRISTATA (Boddaert).

Tantalus cristatus BODDAERT, Tabl. Pl. Enlum., 1783, p. 51.
Lophotibis cristatus BONAPARTE, Consp. Av., II, 1855, p. 154.

Two examples from the East Imerina Forest. One of these is an immature bird, differing from the adult in rufous edgings to the wing-coverts, and in the paler color of all the chestnut areas. The following data refer to the adult: "Iris reddish; skin around eye bright red; beak greenish; feet dark red."

Family PLATALEIDÆ.

PLATALEA ALBA Scopoli.

Platalea alba SCOPOLI, Del. Flor. et Faun. Insubr., II, 1786, p. 92.

One adult from "between the two forests," East Madagascar.

Family ARDEIDÆ.

ARDETTA PODICEPS (Bonaparte).

Ardeola podiceps BONAPARTE, Consp. Avium, II, 1855, p. 134.
Ardetta podiceps GURNEY, Ibis, 1863, p. 330.

One specimen from "between the two forests," East Madagascar, taken in September, 1895. It is apparently an immature male, for the lower parts are rufous, sparsely streaked with dark brown, the wings and scapulars much mixed with rufous and chestnut.

ARDEOLA XANTHOPODA (Hartlaub).

Ardea xanthopoda HARTLAUB, Journ. f. Orn., 1860, p. 166 (from the Pelzeln manuscript).

One adult specimen in breeding plumage, from "between the two forests," East Madagascar, taken in September, 1894.

Whether or not the present individual is identical with that mentioned by Dr. Sharpe[1] as being different from *Ardeola idæ*, but probably the same as *Garzetta garzetta*, it is certainly not true *Ardeola idæ*, nor can it by any means be referred to *Garzetta garzetta*, but it agrees perfectly with Hartlaub's original description of *Ardea xanthopoda*.[2] It differs from *Ardeola idæ*, with which it has heretofore generally been confounded, chiefly in being almost pure white; from *Garzetta garzetta* it may be distinguished by the following characters, several of which, it will be noticed, may be regarded as generic: Bill shorter and proportionately stouter, the black tip sharply defined from the light base; whole foot very much shorter, and yellowish, not black; plumes of breast entirely decomposed, not lanceolate; head and hind neck strongly suffused with ochraceous, not pure white. It is therefore evident that Dr. Sharpe has insufficient grounds for synonymizing *Ardea xanthopoda* with *Garzetta garzetta*,[3] Captain Shelley being consequently right in his opinion of its distinctness.[4]

A description of this specimen is as follows: Entirely pure white, the head and cervix washed with ochraceous, this deepest on the forehead, gradually disappearing posteriorly; two of the innermost secondaries dull brown, their broad shaft stripes pale yellowish; a few black streaks on the sides of the occiput; ornamental plumes of wholly decom-

[1] Cat. Birds Brit. Mus., XXVI, 1898, p. 207.
[2] Idem., p. 207.
[3] Idem., p. 272.
[4] List Birds Africa, I, 1896, p. 157.

posed feathers adorn the fore and hind neck and the back, most conspicuously developed on the last; feet in skin dull yellowish; bill at tip black, sharply and almost vertically defined from the brownish base of maxilla and the yellowish base of mandible.

Length of wing, 250 mm.; tail, 94 mm.; exposed culmen, 61 mm.; tarsus, 58 mm.; middle toe and claw, 59 mm.

BUTORIDES ATRICAPILLUS (Afzelius).

Ardea atricapilla AFZELIUS, Vet. Acad. Handl., XXV, 1804, p. 264.
Butorides atricapilla BONAPARTE, Consp. Avium, II, 1855, p. 129.

One adult from "between the two forests," East Madagascar.

Family ANHINGIDÆ.

ANHINGA RUFA (Lacépède and Daudin).

Plotus rufus LACÉPÈDE and DAUDIN, in Buffon's Hist. Nat. Quadr., XIV, 1799, p. 319; Ois., XVII, p. 81.

One specimen, evidently an immature female, from "between the two forests," East Madagascar, taken in February, 1895. The under parts of this individual vary from deep ochraceous to dull dark brown, but are without black. The white band below the eye is wanting; the light areas on the secondary coverts are large and nearly white; the scapulars are but slightly developed.

Family PHASIANIDÆ.

MARGAROPERDIX MADAGARENSIS (Scopoli).

Tetrao madagarensis SCOPOLI, Del. Flor. et Faun. Insubr., Pt. 2, 1786, p. 93.
Margaroperdix madagascariensis HARTERT, Kat. Mus. Senckenb., 1891, p. 195.

One specimen from Imerina, July, 1894.

Family COLUMBIDÆ.

TURTUR PICTURATUS (Temminck).

Columba picturata TEMMINCK, Pig. et Gallin., I, 1813, pp. 315, 480.
Turtur picturatus BLYTH, Cat. B. Mus. As. Soc. B., 1849, p. 236.

Three specimens from East Imerina. "Iris brown; beak red-brown; feet reddish." These individuals, as is frequently the case in this species, have the slate color of the rump more or less mixed with brown.

Family FALCONIDÆ.

FALCO ZONIVENTRIS (Peters).

Hypotriorchis zoniventris PETERS, Sitz. k. Pr. Akad. Wiss. Berlin, 1853, p. 7.
Falco zoniventris SCHLEGEL and POLLEN, Faun. Madagascar, Ois., 1868, p. 165.

One male, apparently adult, from the East Imerina Forest, March, 1895. By reason of heavy streaking the jugulum is almost uniform blackish. The specimen appears to have been in process of molt when taken, as among the fresh feathers there are remains of the old plumage.

FALCO MINOR Bonaparte.

Falco minor BONAPARTE, Rev. et Mag. de Zool., 1850, p. 484.

One specimen from the Ambohitritrimo Forest, East Imerina, December, 1894. This bird is an immature female, with dark brown upper parts and streaked lower surface. The ground color of the hind neck is buffy ochraceous, not deep rufous, as given by Sharpe.[1]

BUTEO BRACHYPTERUS Hartlaub.

Buteo brachypterus HARTLAUB, Journ. f. Orn., 1860, p. 11 (from the Pelzeln manuscript).

One adult male taken from the East Imerina Forest, taken in October, 1895.

ACCIPITER MADAGASCARIENSIS Verreaux.

Accipiter madagascariensis J. VERREAUX, S. Afr. Quar. Journ., II, 1833, p. 80.

Two immature females from East Imerina, February, 1895.

ACCIPITER FRANCESII Smith.

Accipiter francesii SMITH, S. Afr. Quar. Journ., II, 1834, p. 280.

Five specimens, from the East Imerina and Ambohitritrimo forests. All seem to be more or less immature, most of them with the bars on the middle tail-feathers not distinctly indicated. The different individuals vary somewhat in the width of the barring below.

CIRCUS MAILLARDI Verreaux.

Circus maillardi VERREAUX, in Maillard l'Ile de la Réun., II, 1863, p. 12.

One handsome adult male from the East Imerina Forest, taken in October, 1895.

POLYBOROIDES RADIATUS (Scopoli).

Vultur radiatus SCOPOLI, Del. Flor. et Faun., Insubr., II, 1786, p. 85.
Polyboroides radiatus GRAY, List Gen. Birds, 1840, p. 5.

One adult female from the Mampidongy Forest, East Imerina, February, 1896. "Iris dark brown, feet yellowish."

Family BUBONIDÆ.

PISORHINA MENADENSIS RUTILA (Pucheran).

Scops rutilus PUCHERAN, Rev. et Mag. de Zool., 1849, p. 29.

Three specimens. Two of these, respectively from the Ambohitritrimo and Vorwate forests, East Imerina, are immature birds in the rufous phase, with the adult plumage not yet fully acquired, the old feathers still persisting on the nape. The remaining example is an adult in the brown phase, and is quite dark.

[1] Cat. Birds Brit. Mus., I, 1874, p. 383.

All the subspecies of *Pisorhina magica* should be ranked as forms of *Pisorhina menadensis;* for the original description of the latter[1] appeared several years in advance of the former.[2]

These various races are as follows:

Pisorhina menadensis menadensis (Quoy and Gaimard).
Pisorhina menadensis magica (Müller).
Pisorhina menadensis leucospila (Gray).
Pisorhina menadensis bouruensis (Sharpe).
Pisorhina menadensis morotensis (Sharpe).
Pisorhina menadensis siaoensis (Schlegel).
Pisorhina menadensis albiventris (Sharpe).
Pisorhina menadensis rutila (Pucheran).
Pisorhina menadensis brookii (Sharpe).
Pisorhina menadensis sulaensis (Hartert).

Family PSITTACIDÆ.

CORACOPSIS NIGRA (Linnæus).

Psittacus niger LINNÆUS, Syst. Nat., 10th ed., I, 1758, p. 99.
Coracopsis nigra WAGLER, Mon. Psitt., 1832, p. 680.

A pair of adults from the forest of East Imerina. The female is similar to the male, but in size is rather less, and in color throughout not so deep.

Family CUCULIDÆ.

COUA REYNAUDII Pucheran.

Coua reynaudii PUCHERAN, Rev. Zool., 1845, p. 51.

Three specimens from the forest of East Imerina. Two of these are immature birds, having the rufous of crown and forehead much obscured by dull olive, the greater and median wing-coverts tipped with chestnut, the lower surface much mixed with the same color. The adult is noticeably paler below than a specimen collected by Dr. Abbott 80 miles northwest of Mahanoro.

COUA CÆRULEA (Linnæus).

Cuculus cæruleus LINNÆUS, Syst. Nat., 12th ed., I, 1766, p. 171.
Coua cærulea GRAY, in Griffith's An. Kingdom, VII, 1829, p. 458.

Three specimens from the forest of East Imerina. "The flesh round the eyes a most brilliant lightish blue." These individuals are somewhat paler, both above and below, than most of the others at present available, but this difference does not seem to be correlated with locality. Two of them, taken early in February, are in process of molt, this observable chiefly in the wings and tail.

[1] Quoy and Gaimard, Voyage de l'Astrolabe, I, 1826–34, p. 170, pl. II, fig. 2.
[2] Müller, Verhandl. Natuurl. Gesch. Nederl., Zool., 1840–1844, p. 110.

CUCULUS POLIOCEPHALUS ROCHII (Hartlaub).

Cuculus rochii HARTLAUB, Proc. Zool. Soc. Lond., 1862, p. 224.
Cuculus poliocephalus var. *rochii* MILNE-EDWARDS and GRANDIDIER, Hist. Madag., Ois., I, 1879, p. 176.

Two specimens from the forest of East Imerina. "Iris clear brown; eyelid yellow; feet yellow." One of these is a young bird, with brown and rufous barred upper surface; the other is an adult. Judging from the small series at hand, the Madagascar form of *Cuculus poliocephalus* differs from that of Central Asia in the conspicuously darker color of the upper parts, as well as in the somewhat narrower barring below, and forms apparently a well-marked geographical race, to which is applicable the name *rochii* Hartlaub, as above given.

Family CAPRIMULGIDÆ.

CAPRIMULGUS ENARRATUS Gray.

Caprimulgus enarratus GRAY, Ann. and Mag. Nat. Hist., 1871, p. 428.

One adult female from the forest of East Imerina, February, 1896. "Eye yellowish brown." The tail-feathers are in process of molt.

Family CORACIIDÆ.

EURYSTOMUS GLAUCURUS (Müller).

Coracias glaucurus MÜLLER, Syst. Nat., Anhang., 1776, p. 86.
Eurystomus glaucurus GRAY, Hand-list Birds, I, 1869, p. 76.

Five specimens. One of the three adults is very deeply colored, particularly above; its throat and breast are brilliant violet instead of the usual rose purple. Of the two immature birds one is still greenish blue below; the other has much brownish and some purplish admixture. In these last the feathers of the upper surface have more or less dark brown centrally, imparting a mottled appearance that is absent in the adults.

ATELORNIS CROSSLEYI (Sharpe).

Atelornis crossleyi SHARPE, Proc. Zool. Soc. Lond., 1875, p. 74, pl. XIV.

Two specimens from the forest of East Imerina. "Iris light brown." The bird marked male has the crissum blue; the one sexed female has the same part bluish green.

ATELORNIS PITTOIDES (Lafresnaye).

Brachypteracias pittoides LAFRESNAYE, Mag. de Zool., 1834, pl. XXXII.
Atelornis pittoides PUCHERAN, Rev. Zool., 1846, p. 200.

Two specimens from the forest of East Imerina. "Iris dark brown." One of these is an immature bird, differing from the adult in the particulars mentioned by Dr. Sharpe,[1] also in the conspicuous chestnut margins of the wing-coverts and the superior tail-coverts.

[1] Cat. Birds Brit. Mus., XVII, 1892, p. 8.

BRACHYPTERACIAS LEPTOSOMUS (Lesson).

Colaris leptosomus LESSON, Illustr. Zool., 1832, pl. xx.
Brachypteracias leptosomus LAFRESNAYE, Mag. de Zool., 1834, Ois., pl. xxxi.

One specimen, from the forest of East Imerina, February, 1876. "Iris light yellow; feet grayish." This bird is immature, in which stage the colors of the head and lower surface are rather paler than in adults.

Family ALCEDINIDÆ.

CORYTHORNIS CRISTATUS (Linnæus).

Alcedo cristata LINNÆUS, Syst. Nat., 12th ed., I, 1766, p. 178.
Corythornis cristata KAUP, Fam. Alced., 1848, p. 13.

Five specimens of this pretty little kingfisher are in the collection—all from Imerina. "Iris dark brown; feet coral red." There seems to be but little individual variation among the adults of this species.

Family PHILEPITTIDÆ.

PHILEPITTA CASTANEA (Müller).

Turdus castaneus MÜLLER, Syst. Nat., Anhang., 1776, p. 143.
Philepitta castanea GRAY, Hand-list Birds, I, 1869, p. 297.

Five immature specimens, from the forest of East Imerina. Two of these, taken in February, are molting into the black and yellow plumage of the adult. "Eye light brown."

Dr. Richmond is apparently quite right in his view[1] that the yellow tips to the black feathers are not an evidence of immaturity, but simply the usual accompaniment of the fresh molt, wearing off by abrasion until the bird assumes a jet black appearance.

The earliest name for the present species is *Turdus castaneus* Müller, which antedates *Turdus jala* Boddaert by five years; and there seems to be no reason why it should not be adopted, as has already been done by Dr. Richmond.[2]

Family ALAUDIDÆ.

MIRAFRA HOVA Hartlaub.

Miraffra hova HARTLAUB, Journ. f. Orn., 1860, p. 106.

One specimen, from Imerina.

[1] Proc. U. S. Nat. Mus., XIX, 1897, p. 688.
[2] Idem.

Family MOTACILLIDÆ.

MOTACILLA FLAVIVENTRIS Hartlaub.

Motacilla flaviventris HARTLAUB, Journ. f. Orn., 1860, p. 94 (from Verreaux).

Two specimens in rather worn plumage.

The specific name *flaviventris* in this connection is commonly credited to Verreaux;[1] but the first description of the species seems to have been published by Hartlaub, who, therefore, rather than Verreaux, should, as above given, be cited as the proper authority.[2]

Family PYCNONOTIDÆ.

TYLAS EDUARDI Hartlaub.

Tylas eduardi HARTLAUB, Proc. Zool. Soc. Lond., 1862, p. 152, pl. XVIII.

One specimen, from the forest of East Imerina. This is an immature bird, and differs from the adult in that the forehead and throat are much mixed with white, the greater and median coverts tipped with ochraceous. "Iris brown."

HYPSIPETES MADAGASCARIENSIS (Müller).

Turdus madagascariensis MÜLLER, Syst. Nat., Anhang, 1776, p. 139.
Hypsipetes madagascariensis SCHLEGEL, Proc. Zool. Soc., 1866, p. 422.

Four specimens from East Imerina. "Iris brown; feet reddish yellow."

The only character adduced by Dr. Sharpe[3] for the differentiation of *Ixocincla* from *Hypsipetes* is the tarsal scutellation, a distinction which examination of a series of perfect specimens does not sustain, in so far at least as is concerned comparison of the present species with *psaroides*, the type of *Hypsipetes*. Whatever may be the affinities of the other forms, with which we at present have nothing to do, *psaroides* and *madagascariensis* are strictly congeneric.

Family TIMELIIDÆ.

BERNIERIA MADAGASCARIENSIS (Gmelin).

Muscicapa madagascariensis GMELIN, Syst. Nat., I, 1788, p. 940.
Bernieria madagascariensis HARTLAUB, Journ. für Orn., 1860, p. 90.

One specimen from the forest of East Imerina. This is a young bird in first plumage, and differs from the adult in the very dingy, less greenish color of the upper parts, particularly the back, and in the duller, more buffy color of the lower surface.

[1] Cat. Rivoli Coll., 1846, p. 9.
[2] See also Richmond, Proc. U. S. Nat. Mus., XIX, 1897, p. 688.
[3] Cat. Birds Brit. Mus., VII, 1881, p. 45.

OXYLABES MADAGASCARIENSIS (Gmelin).

Motacilla madagascariensis GMELIN, Syst. Nat., I, 1788, p. 952.
Oxylabes madagascarensis SHARPE, Proc. Zool. Soc. Lond., 1870, p. 386.

The single specimen referred to this species agrees in most respects with Dr. Sharpe's description of the very young bird,[1] except that the breast has no admixture of rufous feathers. The shade of the entire upper parts, including wings and tail, is a much less rufescent olive than in the adult. Judging from the texture of the plumage, however, this individual does not seem to be a very young bird.

CROSSLEYIA XANTHOPHRYS (Sharpe).

Oxylabes xanthophrys SHARPE, Proc. Zool. Soc. Lond., 1875, p. 76.
Crossleyia xanthophrys HARTLAUB, Vög. Madag., 1877, p. 168.

One adult specimen. The tail and upper tail-coverts lack the brown transverse markings; otherwise it seems to be typical. The structure of the nostrils and the much obliterated scutellation of the tarsus sufficiently distinguish *Crossleyia* from *Oxylabes*, with which it has been recently united by Captain Shelley.[2]

Family TURDIDÆ.

PSEUDOCOSSYPHUS SHARPEI (Gray).

Cossypha sharpei GRAY, Ann. and Mag. Nat. Hist., 1871, p. 429.
Pseudocossyphus sharpii SHARPE, Cat. Birds Brit. Mus., VII, 1883, p. 22.

Two specimens from the forest of East Imerina, taken in February, 1896. One of these is in the spotted first plumage; the other is just emerging from this condition, having still some buffy markings on wing-coverts, head. and neck.

Family SYLVIIDÆ.

NESILLAS TYPICA (Hartlaub).

Ellisia typica HARTLAUB, Journ. f. Orn., 1860, p. 92.
Nesillas typica OBERHOLSER, Proc. Acad. Nat. Sci. Phila., 1899, p. 211.

Four specimens from the forest of East Imerina. In the color of the upper parts there is considerable individual difference, some of which is undoubtedly due to wear. Immature birds are more rufescent above than adults.

DROMÆOCERCUS BRUNNEUS Sharpe.

Dromæocercus brunneus SHARPE, Proc. Zool. Soc. Lond., 1877, p. 23 pl. II, fig. 2.

One specimen from the forest of East Imerina.

[1] Cat. Birds Brit. Mus., VII, 1883, p. 572.
[2] Birds of Africa, I, 1896, p. 65.

CISTICOLA CHERINA (Smith).

Drymoica cherina SMITH, Ill. Zool. S. Afr., Aves, 1843, pl. LXXVII, fig. 2.
Cisticola cherina SHARPE, Layard's Birds S. Afr., 1876, p. 278.

One example from Imerina. It is apparently an adult, and is in the phase having a uniform crown; the lower surface is almost without yellow tinge.

Family MUSCICAPIDÆ.

TCHITREA MUTATA (Linnæus).

Muscicapa mutata LINNÆUS, Syst. Nat., 12th ed., I, 1766, p. 325.
Tchitrea mutata GRAY, Genera Birds, I, 1846, p. 259.

Three specimens from East Imerina. One of these is a male just assuming the plumage of the adult, the tail being white and black, the lower parts mixed white and rufous. The two other individuals are young males, one in the rufous plumage of the female, the second in the dark, rich chestnut garb.

The generic name *Terpsiphone*, currently employed for the group of flycatchers to which the present species belongs, was originally proposed by Gloger[1] as a substitute for *Muscipeta* Cuvier,[2] because *Muscipeta* was considered "zu ähnlich und ganz gleich bedeutend mit *Muscicapa;*" and since the type of *Muscipeta* is the South American *Todus regius* Gmelin (= *Muscivora regia* auct.), it follows that the same species must be regarded as the type of *Terpsiphone*. This being the case, *Terpsiphone* can of course not be used to designate the Old World genus, for which the name *Tchitrea* Lesson[3] then becomes available.

PRATINCOLA SIBILLA (Linnæus).

Motacilla sibilla LINNÆUS, Syst. Nat., 12th ed., I, 1766, p. 337.
Pratincola sybilla BONAPARTE, Consp. Av., I, 1850, p. 304.

Two specimens—an adult male, somewhat worn, and a young bird in the spotted plumage.

NEWTONIA AMPHICHROA Reichenow.

Newtonia amphichroa REICHENOW, Journ. f. Orn., 1891, p. 210.

Two examples of this rare species are in the collection. The points of difference from *Newtonia brunneicauda* given by Dr. Reichenow are fully sustained by the two adult specimens in the National Museum; and, in addition, *amphichroa* seems to have a somewhat larger bill.

One of the present examples is in first plumage, and may be described as follows: Crown, nape, and rump chestnut; back olive brown, tinged

[1] Froriep's Notizen, XVI, No. 18, March, 1827, p. 278.
[2] Règne Anim., I, 1817, p. 344.
[3] Traité d'Orn., 1831, p. 386.

with reddish; tail and wings fuscous, margined exteriorly with olivaceous; wing-coverts olivaceous, broadly tipped with chestnut; entire lower surface dark fulvous, slightly paler on the posterior portion.

Family NECTARINIIDÆ.

CINNYRIS SOVIMANGA (Gmelin).

Certhia sovimanga GMELIN, Syst. Nat., I, 1788, p. 471.
Cinnyris soui-manga BONAPARTE, Consp. Avium, I, 1850, p. 407.

Two individuals from the forest of East Imerina. One of these is an adult; the other a young male, which differs from the adult of the same sex in being nearly uniform grayish olive green above, with only a few scattered metallic feathers; sides of head and neck dull olive grayish, mixed with pale yellowish; throat dull black; crissum yellowish white; remainder of lower parts bright yellow, the sides washed with olive.

NEODREPANIS CORUSCANS Sharpe.

Neodrepanis coruscans SHARPE, Proc. Zool. Soc. Lond., 1875, p. 76.

A single adult male from East Imerina. The forehead is olive green without metallic luster, and the crown and cervix have many plain olive green feathers intermingled with the metallic ones.

Family MELIPHAGIDÆ.

ZOSTEROPS MADERASPATANA (Linnæus).

Motacilla maderaspatana LINNÆUS, Syst. Nat., 12th ed., I, 1766, p. 334.
Zosterops maderaspatana RICHMOND, Proc. U. S. Nat. Mus., XIX, 1897, p. 693.

Two specimens from the forest of East Imerina are identical with those collected by Dr. Abbott. The earliest name for the present species, which is commonly known as *Zosterops madagascariensis*, seems to be *Motacilla maderaspatana* Linnæus, as already pointed out by Dr. Richmond.[1]

Family PLOCEIDÆ.

NELICURVIUS NELICOURVI (Scopoli).

Parrus nelicourvi SCOPOLI, Del. Flor. et Faun. Insubr., 1786, p. 96.
Nelicurvius nelicourvi BARTLETT, Proc. Zool. Soc. Lond., 1879, p. 771.

One specimen, from the forest of East Imerina. The loose texture of the plumage and the lack of yellow on the forehead indicate immaturity. "Iris brown; feet maroon."

FOUDIA MADAGASCARIENSIS (Linnæus).

Loxia madagascariensis LINNÆUS, Syst. Nat., 12th ed., I, 1766, p. 300.
Foudia madagascariensis BONAPARTE, Consp. Avium, I, 1850, p. 445.

Four examples from Imerina. One of these is a young male in transition plumage, the back being olive green and black, the posterior lower parts dull olive grayish; but the head and throat are bright scarlet as in the adult. "Iris [of adult male] brown."

[1] Proc. U. S. Nat. Mus., XIX, 1897, p. 693.

Family CAMPEPHAGIDÆ.

GRAUCALUS CINEREUS (Müller).

Muscicapa cinerea MÜLLER, Syst. Nat., Anhang, 1776, p. 171.
Graucalus cinereus SHARPE, Cat. Birds Brit. Mus., IV, 1879, p. 28.

Two specimens from the forest of East Imerina. These appear to be immature birds just completing the plumage of the adult. The chin is strongly washed with brownish, the remaining lower parts slightly so; the innermost secondaries are conspicuously tipped with white; the primaries and secondaries are distally margined on exterior webs with buffy. One of these birds differs from the other in having an almost black nuchal collar, and, though in other respects resembling the female, is apparently a male. This individual has the greater wing-coverts tipped and exteriorly edged with buffy white. "Iris dark brown."

Family DICRURIDÆ.

EDOLIUS FORFICATUS (Linnæus).

Lanius forficatus LINNÆUS, Syst. Nat., 12th ed., I, 1766, p. 134.
Edolius forficatus CUVIER, Règne Animal, I, 1817, p. 350.

One example, an adult male, from the forest of East Imerina. "Iris red."

Family LANIIDÆ.

CALICALICUS MADAGASCARIENSIS (Linnæus).

Lanius madagascariensis LINNÆUS, Syst. Nat., 12th ed., I, 1766, p. 137.
Calicalicus madagascariensis BONAPARTE, Compt. Rend., XXXVIII, 1854, p. 535.

One adult female from the forest of East Imerina.

VANGA CURVIROSTRIS (Gmelin).

Lanius curvirostris LINNÆUS, Syst. Nat., 12th ed., I, 1766, p. 135.
Vanga curvirostris CUVIER, Règne Anim., I, 1817, p. 339.

Three specimens, from the forest of East Imerina. They are apparently immature, having the forehead, nuchal collar, and lower surface pale gray instead of white. One of them has all the light portions of the plumage strongly tinged with brownish, evidently an adventitious stain. "Iris brown; beak black; feet pearly gray."

Family STURNIDÆ.

HARTLAUBIUS AURATUS (Müller).

Turdus auratus MÜLLER, Syst. Nat., Anhang, 1776, p. 140.
Hartlaubius auratus RICHMOND, Proc. U. S. Nat. Mus., XIX, 1897, p. 693.

One individual, a female, from the forest of East Imerina, is appreciably smaller than males in the National Museum. "Iris dark brown."

In the female of this species the brilliant metallic blue of the exterior webs of the wing-quills is replaced on the primaries by green, on the secondaries by brown with a marginal and distal greenish gloss; and the white of the wing is very much reduced in extent.

The specific term *auratus* of Müller seems to be the earliest one for the species, having seven years priority over *madagascariensis* Boddaert[1]; and, since it seems to be eligible, should be given the preference, as has already been done by Dr. Richmond in the article previously cited.

[1] Tabl. Pl. Enlum., 1783, p. 32

REPORT ON A COLLECTION OF DIPTEROUS INSECTS FROM PUERTO RICO.

By D. W. COQUILLETT,

Custodian of the Diptera in the U. S. National Museum.

During the months of January and February, 1899, Mr. August Busck, of the U. S. Department of Agriculture, through the courtesy of the U. S. Fish Commission, visited various portions of Puerto Rico, and among other things collected quite a large series of dipterous insects, which were later deposited in the U. S. National Museum. This series comprises 864 specimens, representing 117 species, distributed in 79 genera and 31 families. Three of the genera and sixteen of the species appear to be new to science, and are duly characterized in the following pages. Fifty-one of the species, nearly one-half of the whole number, also occur in the United States proper, several of them ranging as far northward as the State of New Hampshire. Twenty of the others have not as yet been reported as occurring outside of Puerto Rico, while the remaining forty-six species have also been obtained in some other island of the West Indies or in Central or South America.

Only a very few species of Diptera were described from Puerto Rico by the older authors, and it was not until the year 1885 that any considerable number of species were reported from that island. In that year Herr Victor von Roeder, of Hoym, Germany, published a list, with descriptions of new forms, of a series of these insects collected by Consul Krug.[1] This list numbers 111 species, of which 76 are different from those obtained by Mr. Busck; adding these to the 117 species obtained by the latter gives a total of 193 species now known to occur in Puerto Rico.

The report in detail is as follows:

Family CECIDOMYIIDÆ.

DIPLOSIS COCCIDARUM Cockerell.

Twenty specimens bred from larvæ associated with *Dactylopius citri*, and nine specimens bred from *Lecanium hemisphaericum;* also a single specimen captured at Mayaguez in January. This species was origi-

[1] Entomologische Zeitung zu Stettin, 1885, pp. 337-349. Republished, with notes, by Señor Juan Gundlach in the Anales de la Sociedad Espanola de Historia Natural, 1887, pp. 177-199.

nally described from specimens bred from larvæ associated with various Coccids and Aleurodes at Kingston, Jamacia. The Puerto Rican specimens do not differ appreciably from a series of six specimens from the former locality received from Professor Cockerell and by him bred from larvæ associated with *Pulvinaria urbicola*.

Family CULICIDÆ.

CULEX PERTURBANS Walker.

Two specimens captured at Bayamon in January. This species also occurs in this country, extending from Maryland southward to Florida and Texas.

Family CHIRONOMIDÆ.

CHIRONOMUS REDUENS Walker.

A single specimen captured at Aguadilla in January. This species is also known to occur in Mississippi.

CERATOPOGON SEQUAX Williston.

Seventeen specimens captured in January at Utuado, Aguadilla, Bayamon, and Mayaguez. It was originally described from St. Vincent, West Indies.

CERATOPOGON PUNCTIPENNIS Williston.

A single specimen from Aguadilla in January. This species was also originally described from St. Vincent.

Family BIBIONIDÆ.

SCATOPSE PYGMÆA Loew.

Two specimens captured at Mayaguez in January. The species was originally described from the District of Columbia, but has also been reported from St. Vincent, West Indies.

Family TIPULIDÆ.

GERANOMYIA RUFESCENS Loew.

A single specimen collected at Aguadilla in January. Originally described from Puerto Rico.

ATARBA PLEURALIS Williston.

A single specimen captured at Aguadilla in January. The type locality of this species is St. Vincent, West Indies.

Family STRATIOMYIIDÆ.

HERMETIA ILLUCENS Linnæus.

Two specimens collected at Utuado and Aguadilla in January. The species has a wide distribution, extending from the southern portion of the United States, through Mexico, Central America, and the West Indies, into South America at least as far as Brazil.

ODONTOMYIA DORSALIS Fabricius.

A single specimen from Fajardo in February. It has previously been reported from Santo Domingo, West Indies, and South America.

Family ASILIDÆ.

PROCTACANTHUS RUFIVENTRIS Macquart.

A female specimen captured at Arroyo in February. The species was originally described from Santo Domingo, and has already been reported from Puerto Rico by Mr. V. von Roeder.

Family BOMBYLIIDÆ.

HYPERALONIA SERVILLEI Macquart.

Eleven specimens, Mayaguez and Aguadilla in January, and Fajardo, Arroyo, and Vieques Island in February. Specimens are also in the U. S. National Museum from Nassau, Bahama Islands, collected by Dr. H. G. Dyar.

ANTHRAX GORGON Fabricius.

Seven specimens, captured at Mayaguez and Aguadilla in January, and Vieques Island and Fajardo in February. The species was originally described from the West Indies, and has been reported from Puerto Rico by Mr. von Roeder.

Family EMPIDÆ.

EUHYBUS SUBJECTUS Walker.

A single specimen, collected at Utuado in January. This species is also found in the eastern portion of the United States, ranging from the White Mountains, New Hampshire, to the southern part of Florida.

TACHYDROMIA FLAVIDA Williston.

Three specimens, captured at Aguadilla in January, and Fajardo in February. The species was originally described from St. Vincent, West Indies, and was placed by Dr. Williston in the genus *Drapetis*. It is, however, a true *Tachydromia*, having the front femora considerably thickened, as stated in the original description.[1]

Family DOLICHOPODIDÆ.

PARACLIUS FILIFERUS Aldrich.

Three specimens, captured on Vieques Island in February. The species was originally described from St. Vincent, West Indies.

PELASTONEURUS FASCIATUS Roeder.

Five specimens, from Arroyo, Vieques Island, and Fajardo in February. The type locality of this species is Puerto Rico.

[1] In Williston's table of the species of *Drapetis* collected in St. Vincent two serious errors occur. For *xanthopoda* read *flavidus*, and for *flavipes* read *xanthopodus*. The table is published in Trans. Ent. Soc. London for 1896, p. 441.

PSILOPUS LONGICORNIS Fabricius.

A single specimen, collected at Fajardo in February. The species was originally described from the West Indies.

PSILOPUS PORTORICENSIS? Macquart.

Five specimens, from Mayaguez and Aguadilla in January, and Arroyo and Vieques Island in February. They agree very well with the short description, which was based on a specimen from Puerto Rico, except that the antennal arista is wholly bare.

SYNTORMON BARBATUS Loew.

Utuado, in January. A single specimen of this species, originally described from the Middle States.

CHRYSOTUS PALLIPES Loew.

Thirty-two specimens, from Utuado, Aguadilla, Bayamon, and Mayaguez in January, and Arroyo, Fajardo, Vieques Island, and Culebra Island in February. Originally described from the Middle States, Dr. Schiner has recorded it from South America, and it is among the species reported by von Roeder from Puerto Rico.

Family SYRPHIDÆ.

BACCHA CLAVATA Fabricius.

Four specimens, collected at Aguadilla and Mayaguez in January, and Fajardo and Arroyo in February. Originally described from South America, this species is at present known to have a very wide range, extending from Nebraska on the north to Buenos Ayres, Argentina, on the south, and including the West Indian and neighboring islands. Von Roeder has already reported it from Puerto Rico.

BACCHA species.

Two specimens were bred from larvæ feeding upon *Dactylopius citri* on Culebra Island in February; they represent a species distinct from the above, but are too immature to admit of a positive identification.

OCYPTAMUS LATIUSCULA Loew.

A single specimen, collected at Fajardo in February. This species was originally described from Cuba, and has also been reported from Jamaica and Santo Domingo. Von Roeder has already recorded it from Puerto Rico.

ERISTALIS VINETORUM Fabricius.

Seven specimens, collected at Mayaguez and Aguadilla in January, and Arroyo in February. This species was originally described from Brazil, and is now reported as occurring over nearly the entire eastern

half of the United States, the whole of Mexico, Central and South America, and the West Indies. It was previously reported from Puerto Rico by von Roeder.

ERISTALIS ALBIFRONS Wiedemann.

A single specimen, collected at Arroyo in February. This species was also originally described from Brazil, and has practically the same distribution as the preceding species.

MESOGRAMMA LACINIOSA Loew.

A single specimen from Utuado in January. The type locality of this species is Cuba, but it is also reported from St. Vincent, West Indies, and von Roeder has recorded its occurrence in Puerto Rico.

MESOGRAMMA ARCIFERA Loew.

Twelve specimens collected at Mayaguez and Aguadilla in January, and Vieques Island, Culebra Island, Arroyo, and Fajardo in February. This species was also originally described from Cuba, and has been reported by Mr. C. W. Johnson as occurring in Jamaica.

MESOGRAMMA SUBANNULATA Loew.

Eighteen specimens from Utuado and Aguadilla in January, and Vieques Island, Fajardo, and Arroyo in February. Originally described from Cuba, and Mr. Johnson has reported it from Jamaica. *Mesograpta? cuprina* Bigot, also described from Cuba, is a synonym.

Family PHORIDÆ.

PHORA AUREA Aldrich.

Five specimens, taken at Mayaguez and Bayamon in January, and Arroyo in February. This species was originally reported from St. Vincent, West Indies.

Family TACHINIDÆ.

ARCHYTAS BASIFULVA Walker.

A single specimen captured on Vieques Island in February. The type locality of this species is Jamaica, West Indies.

EUPHOROCERA CLARIPENNIS Macquart.

Three specimens, bred February 10, from cocoons of *Megalopyge krugii* Dewitz, collected at San Juan. This Tachinid is found in all parts of the United States, but has not heretofore been reported as occurring outside of this country.

BELVOSIA LUTEOLA, new species.

Female: Head yellow, the occiput, except the lower portion and a semicircular spot in the middle of the upper edge, black, gray pruinose;

frontal vitta opaque, orange yellow; sides of front polished, except the lower outer angles, which are golden yellow pruinose; frontal bristles descending slightly below the arista; face and cheeks silvery white pruinose; sides of face bearing a triangular patch of short white bristly hairs, extending nearly one-third of distance from the lowest frontal bristle to the oral margin; antennæ reaching six-sevenths of distance to the oral margin, black, the first two joints reddish yellow, the third about five times as long as the second, arista thickened almost to its apex, the penultimate joint slightly longer than broad; palpi yellow, proboscis brownish black. Thorax black, gray pruinose, marked with four black vittæ, bearing four pairs of postsutural dorso-central macrochætæ and four sternopleural; scutellum brown, the margin yellowish. Abdomen yellow, the base of the first segment, a dorsal vitta, and the posterior margin of the third segment black; the fourth segment and bases of the two preceding yellowish pruinose, the macrochætæ only marginal. Legs black. Wings blackish, the anterior basal portion subhyaline, tinged in places with yellowish, the third vein bearing two or three bristles near the base; calypteres white. Length, 11 mm. A single specimen taken on Vieques Island in February.

Type.—Cat. No. 4373, U.S.N.M.

HYPOSTENA VANDERWULPII Townsend.

A single specimen captured on Vieques Island in February. The species was originally reported from Florida, but also occurs in southern California.

Family DEXIDÆ.

MYOCERA RUFIANALIS van der Wulp.

A single specimen, from Culebra Island in February. The species was originally described from Mexico, but also occurs in Jamaica, West Indies.

Family SARCOPHAGIDÆ.

SARCOPHAGA OCCIDUA Fabricius.

Fifty-five specimens, collected at Mayaguez, Bayamon, Utuado, and Aguadilla in January; and Vieques Island, Arroyo, and Fajardo in February. The species was originally described from the West Indies.

SARCOPHAGA PLINTHOPYGA Wiedemann.

Twenty-eight specimens, from Aguadilla, Utuado, and Mayaguez in January, and Vieques Island, Culebra Island, and Fajardo in February. This species was originally described from St. Thomas, West Indies, and has been reported from Jamaica by Mr. Johnson and from Puerto Rico by von Roeder.

SARCOPHAGA LAMBENS Wiedemann.

Five specimens, from Vieques Island and Culebra Island in February. Originally described from St. Paul, Brazil, and the West Indies, it has already been reported from Puerto Rico by Mr. von Roeder.

SARCOPHAGA DIVERSIPES, new species.

Female: Black, the first two antennal joints, palpi, trochanters, broad apices of the femora, and the genitalia yellow; frontal vitta dark brown, sides of front golden yellow pruinose, changing to gray at the vertex, one pair of orbital bristles, no ocellar bristles, frontals descending almost to apex of the first antennal joint, middle of face gray pruinose, the sides and upper part of the cheeks golden yellow, remaining portion of the cheeks brownish, sides of face each bearing a row of short, scarcely perceptible, bristly hairs, antennæ nearly reaching the oral margin, the third joint slightly over twice as long as the second, arista long-plumose on the basal three-fourths; thorax gray pruinose, marked with three broad black vitta, a black streak in front of the insertion of each wing and a second near the center of the pleura; three pairs of large postsutural dorso-central macrochætæ, one pair of acrostichals, and two sterno-pleurals; scutellum gray pruinose, the middle third black; abdomen opaque, gray pruinose, three vittæ and the hind margin of each of the first four segments black, the two outermost vittæ being composed of triangular black spots; wings hyaline, the third vein bristly about one-third of distance from its base to the small crossvein; calypteres white. Length, 6 mm. Fajardo, in February. Two specimens.

Type.—Cat. No. 4374, U.S.N.M.

HELICOBIA HELICIS Townsend.

Seven specimens, collected at Bayamon in January, and Fajardo, Arroyo, and Vieques Island in February. This species is distributed over nearly the whole of the United States.

HELICOBIA species.

A single specimen, from Culebra Island in February.

Family CALLIPHORIDÆ.

CHRYSOMYIA MACELLARIA Fabricius.

Two specimens, taken at Mayaguez in January, and Culebra Island in February. The known range of this species is from Ohio southward through Mexico, Central America, the West Indies, and over the greater portion of South America.

LUCILIA CÆSAR Linnæus.

One specimen, collected at Fajardo in February. A European species, which is now distributed over the greater portion of the warmer part of this globe.

Family MUSCIDÆ.

MUSCA DOMESTICA Linnæus.

A single specimen of this cosmopolitan species was captured on Culebra Island in February.

STOMOXYS CALCITRANS Linnæus.

A single specimen, captured on Vieques Island in February. This species has nearly the same distribution as *L. cæsar*.

PYRELLIA OCHRICORNIS Wiedemann.

Nine specimens, taken on Culebra Island in February. The species was originally described from Brazil, but has also been reported from Cuba and Puerto Rico.

MUSCINA TRIPUNCTATA van der Wulp.

A single specimen from Culebra Island in February. The species was originally described from Mexico.

LIMNOPHORA ARCUATA Stein.

Three specimens, captured at Mayaguez in January, and Culebra Island and Arroyo in February. The type locality of this species is Georgia, and I have seen specimens collected in the District of Columbia.

LISPA RUFITIBIALIS Macquart.

Three specimens, taken at Fajardo and Vieques island in February. The species was originally described from South America.

CŒNOSIA VARICORNIS, new species.

Male and female: Black, the third antennal joint of the male, except its base, the extreme apices of the femora, whole of tibiæ, base of tarsi and halteres, yellow; an elongate triangular spot below the ocelli, dark-gray pruinose, sides of front gray pruinose, the face, cheeks, third joint of antennæ, except its base, and the upper edge of the second joint, whitish pruinose; antennæ two-thirds as long as the face, the third joint one and one-third times as long as the second, its lower front corner produced in the form of a sharp tooth; arista short plumose, the longest hairs only slightly longer than its greatest diameter; thorax gray pruinose, marked with five blackish-brown vittæ, the medio-dorsal and lateral ones broad, the former almost crossing the scutellum, the remaining pair narrow and interrupted, rarely wanting; two pairs of postsutural dorsocentral macrochætæ, the bristly hairs between them arranged in two rows; abdomen gray pruinose, a pair of suborbicular blackish spots on the posterior part of the first three segments, those on the second and third the most distinct and each bearing a macrochæta on its anterior part; a blackish-brown interrupted

medio-dorsal vitta, reduced in the female to a dot on the second and third segments; fourth segment bearing a discal and a marginal row of macrochætæ; front tibiæ each bearing a single macrochæta, situated near the middle of the posterior side, middle tibiæ each with a pair near the middle; hind tibiæ each with a circle of four near the middle, besides those at the apices; wings hyaline, unmarked; calypteres white. Length, 4 to 5 mm. Bayamon, Aguadilla, and Utuado in January, and Vieques Island, Fajardo, and Arroyo in February. Ten males and two females.

Type.—Cat. No. 4375, U.S.N.M.

Family SCATOPHAGIDÆ.

SCATOPHAGA EXOTICA Wiedemann.

Four specimens, collected on Culebra Island in February. This species was originally described from New Orleans, Louisiana.

Family MICROPEZIDÆ.

CALOBATA FASCIATA Fabricius.

Eight specimens, captured with the preceding. It has been reported from Jamaica, Puerto Rico, and Florida.

CALOBATA LASCIVA Fabricius.

Six specimens, from Mayaguez in January, and Fajardo and Vieques Island in February. This species was originally described from Cayenne, French Guiana, and has been reported from Puerto Rico, Cuba, Jamaica, Florida, New York, and Mexico, while the U. S. National Museum contains specimens from Georgia, South Carolina, Louisiana, California, and Brazil. Macquart has also recorded it from Philadelphia, Pennsylvania, Java, and Australia, but it is very doubtful that this species occurs in either of the two last-named localities. *Calobata lunulata* of van der Wulp[1] is a synonym, as that author suspected it might be.

MICROPEZA LIMBATA Roeder.

A single specimen collected at Mayaguez in January. The species was originally described from Puerto Rico.

Family ORTALIDÆ.

EUXESTA THOMÆ Loew.

Fifteen specimens, collected at Bayamon, Mayaguez, and Aguadilla in January, and Arroyo and Vieques Island in February. The type locality is St. Thomas, West Indies.

[1] Biol. Cent.-Am., II, p. 372.

EUXESTA STIGMATIAS Loew.

Three specimens, from Mayaguez and Aguadilla in January, and Vieques Island in February. This species was originally described from specimens collected in Cuba and Brazil, and has been reported from Puerto Rico and St. Vincent Island.

EUXESTA SPOLIATA Loew.

Two specimens, from Aguadilla in January, and Fajardo in February. It was originally described from Cuba, and von Roeder has already reported its occurrence in Puerto Rico.

EUXESTA APICALIS Williston.

A single specimen, captured at Utuado in January. The type locality is St. Vincent, West Indies.

Family TRYPETIDÆ.

ACIURA INSECTA Loew.

Twenty-one specimens, from Aguadilla, Mayaguez, and Utuado in January, and Fajardo in February. Originally described from Cuba, this species has been reported from Puerto Rico, Haiti, Jamaica, Florida, Colombia, and Brazil.

TEPHRITIS PEREGRINA Loew.

Thirteen specimens, collected at Aguadilla and Mayaguez in January, and Vieques Island in February. Originally described from Brazil, it has also been reported from St. Vincent, West Indies.

Family SAPROMYZIDÆ.

PHYSEGENUA OBSCURIPENNIS Bigot.

Thirteen specimens, from Utuado, Mayaguez, and Aguadilla in January. Originally described from Cuba, it has been reported from Puerto Rico, Jamaica, and South America. Von Roeder has already published the fact that *Lauxania variegata* Loew, also described from Cuba, is a synonym of the present species.

SAPROMYZA SORDIDA Wiedemann.

A single specimen, collected at Aguadilla in January. This species was originally described from the West Indies, and the U. S. National Museum contains specimens which were collected in Florida and Georgia.

LONCHÆA LONGICORNIS Williston.

A single specimen, captured at Utuado in January. Originally described from St. Vincent, West Indies.

Family SEPSIDÆ.

SEPSIS INSULARIS Williston.

Twenty-eight specimens, collected at Aguadilla, Mayaguez, Bayamon, and Utuado in January and Fajardo and Vieques Island in February. The species was originally described from St. Vincent, West Indies.

Family EPHYDRIDÆ.

NOTIPHILA VIRGATA, new species.

Male: Black, the greater part of the antennæ, palpi, apex of proboscis, halteres, and middle and hind tibiæ and their tarsi, yellow, the front tibiæ and tarsi, brown, their bases sometimes yellowish, the other tibiæ changing into brownish toward their apices; front opaque, yellowish gray pruinose, a black spot between the ocelli, extending downward about halfway to lower edge of the front, and a short distance on either side of this spot is a black vitta which extends across the front and is greatly dilated at its lower end; face yellow pruinose, bearing one or two lateral pairs of macrochætæ on the lower part; thorax opaque, gray pruinose, mesonotum marked with five black vittæ, all, with the exception of the outer pair, extending entirely across it, the median one posteriorly forked, each fork uniting with the adjacent vitta, the outer pair of vittæ considerably abbreviated anteriorly; a brown vitta on the upper part of the pleura and two converging ones almost crossing the scutellum; abdomen opaque, gray pruinose, a pair of large black spots on the front part of segments 2, 3, and 5, each spot at its inner side crossing the segment, the pair on segment 5 slightly polished; the gray portions are marked with several black dots; fourth segment marked with a transverse row of four black, triangular spots besides several black dots; wings grayish hyaline. Length, 3.5 mm. Six male specimens, taken at Utuado and Bayamon in January, and Arroyo and Vieques Island in February.

Type.—Cat. No. 4376, U.S.N.M.

PARALIMNA DECIPIENS Loew.

Three specimens, collected at Utuado and Mayaguez in January. This species was originally described from Texas, and it also occurs in Georgia and Florida.

PARALIMNA OBSCURA Williston.

Two specimens, taken at Bayamon in January and Fajardo in February. Originally described from St. Vincent, West Indies, it has also been reported from Brazil.

ILYTHEA OSCITANS Walker.

A single specimen, captured at Utuado in January. This species was originally described from the United States, without any mention of the exact locality. I have examined a specimen captured in Massachusetts, forming a part of Dr. Garry de N. Hough's collection.

ILYTHEA FLAVIPES Williston.

Four specimens, captured at Utuado and Bayamon in January. It was originally described from St. Vincent, West Indies, and has also been reported from Rio Janeiro, Brazil.

ATHYROGLOSSA NITIDA Williston.

Three specimens, taken at Fajardo and Vieques Island in February. This species was also originally described from St. Vincent.

PSILOPA ACICULATA Loew.

Forty-seven specimens, collected at Utuado, Mayaguez, Bayamon, and Aguadilla in January, and Arroyo, Fajardo, and Vieques Island in February. Originally described from Cuba, it has also been reported from St. Vincent and Grenada islands, and from Rio Janeiro, Brazil. I have studied specimens collected in Georgia and Louisiana, forming part of the collection of Dr. Hough.

PSILOPA NIGRIMANA Williston.

Four specimens, collected at Utuado and Bayamon in January. Originally described from St. Vincent, West Indies, it has also been reported from Brazil.

PSILOPA MELLIPES, new species.

Male and female: Body and head polished, black or bronze green; in the latter case usually with a strong violaceous tinge; antennæ brown, elongated, the third joint from two to almost three times as long as wide; a single macrochæta near each lower corner of the face; proboscis brown, the apex yellow, palpi brown; thorax bearing a single pair of dorso-central macrochætæ; fourth segment of abdomen the longest—about twice as long as the fifth in the male, but only one and one-fourth times in the female; halteres and legs, including the coxæ, yellow; wings hyaline; apex of second vein midway between apices of the first and third veins. Length, 1 to 1.5 mm. Four specimens. collected at Utuado in January and Arroyo in February.

Type.—Cat. No. 4377, U.S.N.M.

ALLOTRICHOMA ABDOMINALIS Williston.

A single specimen, taken at Utuado in January. It was originally described from St. Vincent, West Indies, and has also been reported from Brazil.

DISCOCERINA PARVA Loew.

Six specimens, taken at Aguadilla in January and Arroyo and Vieques Island in February. This species was originally described from the District of Columbia, and the U. S. National Museum contains a specimen captured at Lake Worth, Florida, by Mrs. A. T. Slosson.

DISCOCERINA LEUCOPROCTA Loew.

Eleven specimens, from Utuado, Mayaguez, and Aguadilla in January and Arroyo, Fajardo, and Vieques Island in February. It was originally described from Maryland.

HYDRELLIA GILVIPES, new species.

Male: Black, the greater part of the antennæ, median vitta on the face, the cheeks, palpi, and legs, including the front tarsi, yellow, knob of the halteres whitish; front opaque, dark gray pruinose, the lower corners brown; face and cheeks yellowish-gray pruinose; a row of about seven short bristles extending from the lower part of the face to the occiput, crossing the cheek near the eye; third joint of antennæ oval, only slightly longer than broad; thorax and scutellum opaque, grayish-brown pruinose, that on the pleura light gray; two pairs of dorso-central macrochætæ, no bristly hairs between them; abdomen polished, the center of the second segment and posterior margin of the third yellowish gray pruinose; fourth segment longer than any of the others, about one and one-third times as long as the fifth; wings yellowish hyaline, the apex of the second vein nearly midway between the apices of the first and third veins. Length, 1.2 mm. A single specimen, collected at Bayamon in January.

Type.—Cat. No. 4378, U.S.N.M.

PTILOMYIA, new genus.

Second joint of antennæ bearing a short, forwardly directed macrochæta at its anterior upper angle, the third joint shorter than broad, rounded at the apex, arista bearing about six long bristles on the upper side and with about three shorter ones on the lower side; front slightly contracted at the lower end, two pairs of vertical bristles and two fronto-orbitals, the upper pair of the latter directed backward, the lower one forward, ocellar bristles located higher than the lowest ocellus; no postvertical bristles, front destitute of bristles other than those above mentioned; head in profile forming nearly an equilateral, acute-angled triangle, face convex, not retreating at the oral margin, bearing a transverse row of about six macrochætæ a short distance above the oral margin and with two on each side of the face near the middle; cheeks about one-tenth as wide as the eyeheight, each bearing a stout macrochæta near its center, clypeus hidden, mouth opening very large, proboscis excessively large, enlarging outwardly, palpi slender and nearly linear; eyes bare; auxiliary vein obsolete apically, second basal

cell united with the discal, anal cell wanting, costal vein extending beyond the apex of the fourth vein; legs destitute of stout macrochætæ. Type, the following species:

PTILOMYIA ENIGMA, new species.

Female: Black, the lower side of the third antennal joint and bases of tarsi yellow, halteres yellowish white; head, thorax, and scutellum opaque, dark-gray pruinose, abdomen slightly polished, very thinly brownish pruinose, ovate, composed of six segments, the first and sixth very short, the others subequal in length, each about three times as long as the sixth; wings whitish hyaline, first vein extending slightly beyond the small crossvein, apex of second vein slightly nearer to apex of first than to tip of third vein, first posterior cell slightly widening toward its apex, last section of the fourth vein nearly one and one-half times as long as the penultimate section, hind crossvein slightly shorter than the last section of the fifth vein. Length, 0.9 mm. A single specimen, collected at Bayamon in January.

Type.—Cat. No. 4379, U.S.N.M.

Family DROSOPHILIDÆ.

STENOMICRA, new genus.

Wings narrow, oblanceolate, the alulæ wanting, the posterior margin of the wing convex from base to apex, first vein reaching only to the branching of the second and third veins, small crossvein midway between this branching and the hind crossvein, the latter about eight times its own length from the apex of the fifth vein, penultimate section of the fourth vein about one-eighth as long as the last section, first posterior cell narrowed at its apex, second basal cell united with the discal, anal cell present, tip of second vein nearly midway between the apices of the first and third veins, costal vein prolonged beyond the apex of the fourth vein; ocelli situated near the center of the front, two pairs of vertical bristles and one fronto-orbital, the latter situated below the middle of the orbits, no ocellar nor postvertical bristles; second joint of antennæ bearing a short, forwardly directed macrochæta near the upper outer corner, the third joint broader than long, rounded at the apex, arista bearing several long bristles on the upper side and with a few shorter ones on the lower side; face in profile slightly concave, projecting forward at the oral margin, vibrissæ distinct; mesonotum destitute of short bristly hairs, bearing two pairs of dorsocentral macrochætæ, scutellum with a single pair; tibiæ destitute of a preapical bristle. Type, the following species:

STENOMICRA ANGUSTATA, new species.

Head and its members yellow, the front and occiput opaque, thinly whitish pruinose, an ocellar dot black; mesonotum and scutellum

brown, opaque, densely whitish pruinose; pleura, halteres, legs, and abdomen yellow, the latter in the female brownish at each end, in the male brown on the third and fourth segments; wings hyaline. Length, 1 mm. Two specimens, collected at Bayamon and Utuado in January.

Type.—Cat. No. 4380, U.S.N.M.

CLADOCHÆTA, new genus.

Antennæ projecting obliquely forward and downward, nearly perpendicular, almost as long as the face, the second joint bearing a nearly erect macrochæta at the middle of the upper side and with a smaller, forwardly directed one at the anterior upper angle; third joint scarcely longer than the second, as wide as long, the arista inserted near its base, bare, near the base of the upper side bearing a single bristle which is almost half as long as the arista proper; front bearing two pairs of vertical bristles, one pair of postvertical and one of ocellar, two pairs of orbital bristles, placed one behind the other, the lower pair only slightly below the middle of the front and directed forward, the other pair directed outward and backward, a very small backwardly directed one between the lower one and the eye; on each side of the middle of the lower half of the front are four or five pairs of short bristles directed inward; head at lower part longer than at insertion of antennæ; face in profile strongly concave, vibrissæ well developed; eyes nearly bare, slightly higher than long; cheeks about one-ninth as wide as height of eye, proboscis short, very robust, palpi clavate; legs rather short and slender, nearly bare, each tibia bearing an erect preapical bristle on the outer side, front femora bearing a row of bristles on the upper and under sides; auxiliary vein becoming obsolete beyond its middle, first vein scarcely reaching beyond the first fifth of the length of the wing, apex of second vein over twice as far from the apex of the first vein as from the tip of the third, the latter at the extreme wing-tip, fourth vein outwardly diverging from the third, hind crossvein slightly more than its own length from the apex of the fifth vein, small crossvein slightly before the middle of the discal cell and far beyond the apex of the first vein, penultimate section of the fourth vein only slightly more than half as long as the last section, second basal cell united with the discal, anal cell present, the sixth vein not prolonged beyond the apex of the latter. Type, the following species:

CLADOCHAETA NEBULOSA, new species.

Male and female: Head opaque, yellow, the front, except the orbits, brownish yellow, ocellar dot brown, eyes brownish red, antennæ brown, the first two joints yellow, palpi and proboscis yellow; thorax dark yellow, subopaque, thinly gray pruinose, two pairs of dorsocentral macrochætæ, the bristly hairs between them numerous and not distinctly arranged in rows; three pairs of supra-alar bristles, one præsutural, two posthumeral, one humeral, and two sternoplural; scutellum dark yellow, the margin lighter, bare except for the four marginal

macrochætæ; abdomen reddish brown, somewhat polished; wings grayish, the costal margin to a little beyond the third vein smoky brown, darkest in apex of the marginal cell, both crossveins clouded with brown; the costal vein extends to the apex of the fourth vein; legs and halteres pale yellow. Length, 1 to 1.2 mm. One male and four females collected at Bayamon, Mayaguez, and Aguadilla in January, and Arroyo and Vieques Island in February. Also, a single specimen collected at Motzorongo, Mexico, in January, 1892, by Prof. Herbert Osborn.

Type.—Cat. No. 4381, U.S.N.M.

DROSOPHILA FUNEBRIS Fallen.

Eleven specimens, captured at Bayamon, Mayaguez, and Utuado in January. A European species, which also occurs over the greater portion of the United States.

DROSOPHILA VITTATA Coquillett.

A single specimen, captured at Arroyo in February. The type locality of this species is Charlotte Harbor, Florida.

DROSOPHILA FUSCA, new species.

Brown, the halteres and legs, including the coxæ, yellow; front slightly polished, destitute of short hairs, not pruinose, two pairs of orbital bristles, one placed in front of the other; body noticeably polished, not pruinose, two pairs of dorsocentral macrochætæ, the short bristly hairs between them not disposed in rows; wings hyaline, apex of second vein nearly twice as far from the apex of the first as from that of the third vein; last section of the fourth vein almost twice as long as the preceding section; last section of fifth vein two-thirds as long as the penultimate section of the fourth; costal vein prolonged to the apex of the fourth vein. Length, 1 mm. A single specimen, collected at Utuado in January.

Type.—Cat. No. 4382, U.S.N.M.

Family GEOMYZIDÆ.

ANTHOMYZA NIGRIMANA, new species.

Frontal triangle polished black, reaching almost to the lower end of the front and filling the space between the frontal orbits, the latter, on the upper portion to the single pair of fronto-orbital bristles, polished black, remainder of front opaque, brown, the lower corners yellow; face less than one-fourth as broad as the front at its middle, yellow; first two joints of antennæ brownish yellow, the third yellowish white, arista brown, greatly thickened at the base, rather densely and long plumose; proboscis yellow, palpi brown, occiput and body polished black; legs, including the coxæ, yellow, the front tibiæ and first three joints of their

tarsi black; wings hyaline, halteres whitish, the knobs longer than the stems. Length, 1.2 mm. Three specimens, collected at Utuado and Mayaguez in January.

Type.—Cat. No. 4383, U.S.N.M.

Family OSCINIDÆ.

GAURAX LANCIFER, new species.

Yellow, the antennal arista, an ocellar dot, a somewhat lanceolate spot on the posterior half of the mesonotum, an oval spot on the posterior lower corner of the mesopleura, usually one on the lower part of the pteropleura, and the dorsum of the abdomen except at its base, black; mesonotum polished, marked with three reddish-yellow vittæ, scutellum in outline nearly triangular; wings hyaline. Length, 1.5 to 2 mm. Eight specimens were bred in February from larvæ infesting the egg-sacs of a spider at San Juan. Also, five specimens, bred by Mr. H. G. Hubbard, March 16, 1894, from larvæ infesting the egg-sacs of a spider at Montserrat, West Indies.

Type.—Cat. No. 4384, U.S.N.M.

HIPPELATES CONVEXUS Loew.

Thirty-four specimens, collected at Mayaguez, Bayamon, Utuado, and Aguadilla in January, and Fajardo, Arroyo, and Vieques Island in February. The species was originally described from Cuba, but also occurs in the southern portion of the United States and in Mexico. Three specimens from the last-named country were collected April 10, 1898, by Dr. L. O. Howard, at San Jose de Guaymas.

HIPPELATES PUSIO Loew.

Eighteen specimens, from Mayaguez, Bayamon, and Aguadilla in January, and Fajardo and Arroyo in February. It was originally described from Texas, but ranges as far northward as New Bedford, Massachusetts.

HIPPELATES FLAVIPES Loew.

Five specimens, from Fajardo and Vieques Island in February. The species was originally described from Cuba, but occurs in this country as far northward as Franconia, New Hampshire; this appears to be the most northern limit of any species belonging to the present genus. The specimens from St. Vincent, West Indies, which Dr. Williston refers to *H. flavipes*, evidently belong to some other species, since *flavipes* belongs to his own subgenus *Siphomyia*, whereas he referred his specimens to *Hippelates* as restricted.

HIPPELATES TENER, new species.

Head reddish yellow, the sides of the vertex brown, the occiput, except the lower portion, black; frontal triangle polished dark brown, widely

separated from the eyes and reaching about to the middle of the front, rounded below, front outside of the triangle sparsely covered with bristly hairs; antennæ yellow, upper edge and apex of the third joint black, arista dark brown; palpi and proboscis yellow, apical portion of the latter black, labella slender, folded back; mesonotum dark brown, somewhat polished, but sparsely covered with an appressed yellowish tomentum, one pair of small dorsocentral macrochætæ, the bristly hairs not arranged in rows; pleura reddish yellow, a brown spot on the sternopleura and another above the hind coxæ; scutellum yellow, metanotum and abdomen polished brown; legs yellow and brownish, bases of tarsi yellow; wings hyaline; halteres yellowish white. Length, 1.5 mm. Six specimens, collected at Utuado in January, and Fajardo in February.

Type.—Cat. No. 4385, U.S.N.M.

OSCINIS ANONYMA Williston.

Forty-nine specimens, collected at Mayaguez, Bayamon, Utuado, and Aguadilla in January, and Fajardo, Arroyo, and Vieques Island in February. Originally described from St. Vincent, West Indies.

OSCINIS VIRGATA Coquillett.

Seven specimens, from Bayamon, Utuado, and Aguadilla in January, and Vieques Island in February. The species was originally described from Colorado.

OSCINIS QUADRILINEATA Williston.

Three specimens, taken at Bayamon and Mayaguez in January, and Fajardo in February. Originally described from St. Vincent, West Indies.

OSCINIS OBSCURA, new species.

Black, the labella, halteres, under side of the abdomen, apices of femora, front and middle tibiæ, both ends of the hind ones, and the tarsi except at their apices, yellow; base of abdomen sometimes yellowish; frontal triangle polished, almost touching the eyes at the vertex, reaching the lowest third of the front; labella slender, pointed, folded back; mesonotum and scutellum somewhat opaque, thinly brownish pruinose, no dorsocentral macrochætæ, pleura and abdomen polished; wings hyaline, apex of the second vein midway between the apices of the first and third. Length, 1 to 1.5 mm. Seventeen specimens, collected at Mayaguez, Bayamon, and Utuado in January, and Vieques Island in February.

Type.—Cat. No. 4386, U.S.N.M.

OSCINIS COXENDIX Fitch.

Ten specimens, from Mayaguez, Bayamon, and Utuado in January, and Fajardo in February. This species also occurs from New Hampshire to Florida, and westward to Colorado.

OSCINIS NANA Williston.

Nine specimens, collected at Mayaguez, Utuado, and Aguadilla in January, and Arroyo and Vieques Island in February. Originally described from St. Vincent, West Indies.

OSCINIS UMBROSA Loew.

Nine specimens, taken at Mayaguez, Bayamon, Utuado, and Aguadilla in January. This species was originally described from Pennsylvania, and the U. S. National Museum contains specimens collected in the District of Columbia and Indiana.

CHLOROPS TRIVITTATA Williston.

A single specimen, captured at Arroyo in February. The species was originally reported from St. Vincent, West Indies.

SIGALOESSA BICOLOR Loew.

One specimen, taken at Fajardo in February. The type locality of this species is Cuba.

Family AGROMYZIDÆ.

DESMOMETOPA HALTERALIS, new species.

Black, the bases of the tarsi yellow, a yellow spot between the antennæ and a densely gray pruinose one on the lower edge of the face; front wholly polished, proboscis slender, horny, the labella nearly as long as the proboscis proper and folded back; thorax and scutellum polished, two pairs of dorsocentral macrochætæ; abdomen subopaque, the sides and the fifth and following segments polished; wings white, costal and first veins yellow, the others white, first posterior cell narrowed at its apex. Length, 2 to 2.5 mm. A single specimen captured at Utuado in January; also seven specimens, collected at New Bedford, Massachusetts (Dr. Garry de N. Hough), Lake Worth, Florida (Mrs. A. T. Slosson), New Mexico (Prof. T. D. A. Cockerell), and Colorado (Mr. Carl F. Baker).

Type.—Cat. No. 4387, U.S.N.M.

AGROMYZA ÆNEIVENTRIS Fallen.

Nine specimens, collected at Utuado, Bayamon, Aguadilla, and Mayaguez in January, and Fajardo in February. This is a European species which also occurs over the greater portion of the United States.

AGROMYZA NEPTIS Loew.

Two specimens, from Aguadilla and Mayaguez in January. This species was originally described from Nebraska; the U. S. National Museum contains specimens from several other localities, ranging from Massachusetts to Florida and Texas.

AGROMYZA SETOSA Loew.

A single specimen, captured at Utuado in January. This species was originally reported from the District of Columbia, but occurs over the greater portion of the United States.

AGROMYZA JUCUNDA van der Wulp.

Two specimens, collected at Utuado and Mayaguez in January. Originally reported from Wisconsin, but now found in nearly every State in this country, and Williston reports it from St. Vincent, West Indies, describing it as a supposed new species under the name of *Agromyza lateralis*, new species. The latter name was used by Macquart for a European species as long ago as the year 1835.[1]

AGROMYZA DIMINUTA Walker.

A single specimen, captured at Fajardo in February. This species was originally reported from the United States without mention of any more definite locality. It is found over the greater portion of our country.

LOBIOPTERA INDECORA Loew.

A single specimen, collected on Vieques Island in February. Originally reported from Nebraska, it also occurs in the eastern part of this country, ranging from New Hampshire to Georgia.

OPHTHALMOMYIA LACTEIPENNIS Loew.

One specimen, collected at Bayamon in January. The type locality of this species is Cuba, but specimens are in the U. S. National Museum which were collected at different points in this country, ranging from the District of Columbia to Florida, and westward to New Mexico; it has also been reported from St. Vincent, West Indies.

OPHTHALMOMYIA CINEREA, new species.

Head black, opaque, gray pruinose, antennæ black, the lower portion of the base of the third joint yellowish, palpi yellow, proboscis black, the labella yellowish, rather robust, and only slightly prolonged; thorax and scutellum black, opaque, gray pruinose, mesonotum marked with five black vittæ, of which the median one is prolonged almost across the scutellum, bristly hairs of mesonotum arising from minute black dots, front end and lower portion of the pleura almost destitute of the gray pruinosity; abdomen subopaque, brownish black; legs brownish black, halteres light yellow, wings whitish, the costal and first veins yellowish, the others white. Length, 1.5 mm. A single specimen, collected at Bayamon in January. Although aberrant in its markings, this species possesses all of the important structural characters of the preceding.

Type.—Cat. No. 4388, U.S.N.M.

[1] Hist. Nat. des Ins., Dipt., II, p. 609.

CERATOMYZA DORSALIS Loew.

Two specimens, collected at Arroyo and Vieques Island in February. This species was originally reported from the District of Columbia, but occurs over the greater portion of this country, extending as far westward as Colorado.

LEUCOPIS BELLA Loew.

Three specimens, bred February 2, from larvæ preying upon *Dactylopius citri* on Culebra Island. Originally described from Cuba, but having a wide distribution, extending from Nova Scotia to California and Mexico.

Family BORBORIDÆ.

LIMOSINA FONTINALIS Fallen.

Nineteen specimens, from Bayamon, Utuado, and Mayaguez in January, and Arroyo and Fajardo in February. A European species, which also occurs in the District of Columbia and has been reported from Florida by Mr. C. W. Johnson.

LIMOSINA VENALICIUS Osten Sacken.

Two specimens, collected at Utuado in January. This species was originally described from Cuba, but also occurs at Biscayne Bay, Florida, and has been reported from St. Vincent, West Indies, Brazil, and Africa. Osten Sacken referred it to the genus *Borborus*, in which genus it is retained by Williston, but it is a typical *Limosina*, as is also the *Borborus illotus* of Williston.

LIMOSINA LUGUBRIS Williston.

Two specimens, taken at Aguadilla and Utuado in January. This species was originally reported from St. Vincent, West Indies.

LIMOSINA PERPARVA Williston.

Three specimens, collected at Mayaguez and Utuado in January and Culebra Island in February. This species was also originally reported from St. Vincent.

Family HIPPOBOSCIDÆ.

ORNITHOMYIA ERYTHROCEPHALA Leach.

Eight specimens, captured on a sparrow hawk at Adjunctos in January; also a single specimen, collected at Culebra Island in February. This species was originally described from Brazil, but occurs over a large portion of the Western Continent, having been reported by Osten Sacken as occurring as far northward as Quebec, Canada.

Family NYCTERIBIDÆ.

TRICHOBIUS DUGESII Townsend.

Sixty-two specimens, collected on bats in a cave near Bayamon in January. The species was originally described from Mexico, and the U. S. National Museum contains specimens collected by Mr. H. F. Wickham at Tucson, Arizona, and by Mr. H. G. Hubbard near Kingston, Jamaica.

ASPIDOPTERA BUSCKII Coquillett.

A single specimen representing this genus and species was collected with the preceding specimens.

PTERELLIPSIS ARANEA Coquillett.

Twenty-three specimens, collected with the preceding. This species was originally reported from Jamaica and Montserrat, West Indies.

THE DECAPOD CRUSTACEANS OF WEST AFRICA.

By MARY J. RATHBUN,

Second Assistant Curator, Division of Marine Invertebrates.

This paper was prepared at the request of Prof. O. F. Cook, for the help of collectors and students on the west coast of Africa, and it was his intention to publish it as an appendix to his report of work done for the New York State Colonization Society. The preparation of that report having been unavoidably delayed, it was thought best to publish this portion while it is complete. The region covered extends on the continent from Senegal to Portuguese West Africa, inclusive, or from the River Senegal at about 16° north latitude to the River Kunene at 17° south latitude. It includes the fresh waters tributary to this coast and the islands in the Gulf of Guinea, namely, Princes Island, St. Thomas, and Rolas.

A comparison of the ranges of the species found in this area emphasizes the relation of the fauna to those of America and Europe rather than to the fauna of South and East Africa. Of the 152 species enumerated, 40 occur also in some of the islands west and northwest of Africa—the Azores, Madeiras, Canaries, Cape Verde Islands, Ascension Island, or St. Helena—24 species have been recorded from the Atlantic coast of America, 25 from Europe or the Mediterranean, 8 are South African, 5 East African, 6 extend to the west coast of America, while 15 occur in the oriental region. The widespread species, *Planes minutus*, *Grapsus grapsus*, and *Pachygrapsus transversus* are excluded from the foregoing count.

More than half the species of the list are known to the writer only from descriptions. Professor Cook and his colleagues have extended the range of several species, and have added one, *Clibanarius cooki*, to those hitherto known

The classification used in this paper is chiefly, but not wholly, that of Claus in the Grundzüge der Zoologie. The key to families is made up partly from definitions in that work, and largely from those in Stebbing's History of Crustacea.

KEY TO THE SUBORDERS, TRIBES, AND FAMILIES OF THE ORDER DECAPODA, REPRESENTED ON THE WEST COAST OF AFRICA.

A. Body short, with the carapace usually wide and triangular, rounded or quadrate, and the sternal surface excavated and covered by the abdomen, which is folded forward and narrow in the males, but wide in the females.....Suborder BRACHYURA.

B. Branchiæ not more than nine.

C. Buccal frame quadrate; efferent branchial channels opening at sides of endostomè.

D. Carapace quadrilateral. Frontal region curved downward. Verges of male inserted either in sternal plastron or in basal joints of fifth pair of legs, thence passing through channels in sternum beneath abdomen.....Tribe CATOMETOPA.

E. Carapace hard and firm. Front, orbits, and eyestalks not very small. Buccal frame quadrate anteriorly.

F. Carapace moderately convex or depressed; branchial regions not greatly dilated.

G. Third maxillipeds with fifth joint articulated at the front inner angle usually. Front of moderate width or very narrow. Eyestalks often greatly elongate.....Family OCYPODIDÆ.

G′. Third maxillipeds with fifth joint articulated at apex or front outer angle of fourth. Front usually broad. Eye-stalks of moderate size.....Family GRAPSIDÆ.

F′. Carapace very convex, especially dilated over and in front of the branchial regions; antero-lateral margins entire and strongly arcuate. Seventh joint of walking legs often armed with longitudinal rows of spines. Land crabs.....Family GECARCINIDÆ.

E′. Carapace more or less membranaceous. Front, orbits, and eyestalks very small. Buccal frame arcuate anteriorly. Species of small size, and may be found in shells of bivalve molluska, tests of sea-urchins, and tubes of annelids.....Family PINNOTHERIDÆ.

D′. Carapace not quadrilateral. Male genital openings on the basal joint of the fifth pair of legs.

E. Carapace broad, short, rounded anteriorly, without projecting frontal rostrum.....Tribe CYCLOMETOPA.

F. Buccal cavity well defined. Antennulæ folded transversely or obliquely transversely.

G. Carapace convex. Terminal joint of last pair of legs not flatly expanded.

H. Terminal joint of the last pair of legs usually spinuliferous. Species fluviatile or living in damp earth away from the sea.
Family POTAMONIDÆ.

H′. Terminal joint of last pair of legs usually unarmed. Species marine.....Family PILUMNIDÆ.

G′. Carapace depressed, widest at the last antero-lateral marginal spine. Usually from 5 to 9 antero-lateral teeth or spines. Terminal joint of last pair of legs usually flatly expanded.
Family PORTUNIDÆ.

F′. Buccal cavity not sharply defined, the third maxillipeds usually extending over its anterior margin. Antennulæ folded longitudinally.....Family CANCRIDÆ.

E′. Carapace usually triangular, with projecting pointed rostrum.
Tribe OXYRHYNCHA.

F. Basal joint of antennæ well developed, inserted beneath the eyes and usually forming a great part of the infra-ocular space.
Family MAIIDÆ.

F′. Basal joint of antennæ very small, and with the next joint embedded in the narrow gap between the front and the inner orbital angle ..... Family PARTHENOPIDÆ.

C′. Buccal frame usually triangular, narrowed forward. Efferent channels opening at middle of endostome. Male genital openings on the basal joint of the last pair of legs..... Tribe OXYSTOMATA.

D. Last one or two pairs of feet not articulated higher up than the preceding pairs.

E. Afferent channels to the branchiæ opening behind the pterygostomian regions and in front of the chelipeds.

F. Fifth and following joints of the third maxillipeds not wholly concealed by the fourth joint..... Family CALAPPIDÆ.

F′. Fifth and following joints of the third maxillipeds concealed behind the triangular acute fourth joint..... Family MATUTIDÆ.

E′. Afferent channels to the branchiæ not in front of bases of chelipeds, but at the antero-lateral angles of the endostome.

Family LEUCOSIIDÆ.

D′. Last one or two pairs of feet articulated higher up than the preceding pairs.

E. Afferent channels to the branchiæ in front of bases of chelipeds.

Family DORIPPIDÆ.

E′. Afferent channels to the branchiæ not in front of bases of chelipeds. Pleon short, not folded under the carapace.

Family RANINIDÆ.

B′. Branchiæ more than nine..... Tribe ANOMALA.

C. Last one or two pairs of feet subdorsal, often prehensile, for carrying a shell, sponge, or leaf over the body as a means of concealment.

Family DROMIDÆ.

A′. Body elongate, with the abdomen or pleon usually well developed, longer than the carapace, and extended, or partially so, never closely reflexed against the sternum ..... Suborder MACRURA.

B. Body not compressed. Rostrum depressed, often wanting. First abdominal segment shorter and narrower than the following. Abdominal appendages not oar-shaped. The articulation between the carpus and propodus at two fixed points.

C. Abdomen with hard integument, tapering, and recurved from the middle, and without a swimming fan. Second to fifth pairs of legs short and wide, with terminal joint wide, curved outwardly for swimming and digging in the sand..... Tribe HIPPIDEA.

Family HIPPIDÆ.

C′. Abdomen sometimes soft; when hard it is usually provided with a swimming fan. Second to fifth pairs of legs not wide nor with terminal joint flattened and curved for swimming and digging.

D. Abdomen or pleon usually soft and membranaceous and spirally twisted. Carapace weak or membranaceous behind the cervical groove. Chelipeds and two following pairs of legs well developed, the last two pairs small, one or both being usually chelate.

Tribe PAGURIDEA.

E. First antennæ with peduncle elongate, first joint as long as eyestalks. Second antennæ with peduncle compressed. Hermit crabs chiefly ..... Family CŒNOBITIDÆ.

E′. First antennæ with peduncle of moderate size, first joint short and stout. Second antennæ with peduncle subcylindrical. Hermit crabs.

Family PAGURIDÆ.

D′. Abdomen or pleon with firm integument. Carapace not weak behind the cervical groove.

E. Pleon with segments not overlapping. Rostrum minute or absent. Carapace short. First pair of legs chelate. Eyes small. Burrowing shrimps.....Tribe THALASSINIDEA.
.Family CALLIANASSIDÆ.

E'. Pleon with segments overlapping.

F. First pair of legs simple or only subchelate. Carapace with very thick integument.....Tribe LORICATA.

G. Carapace subcylindrical; external antennæ very long and rigid. "Spiny lobsters".....Family PALINURIDÆ.

G'. Carapace flattened; external antennæ flat, short, squamiform.
Family SCYLLARIDÆ.

F'. First pair of legs chelate. Carapace with moderately firm integument.
Tribe PORCELLANIDEA.
Family PORCELLANIDÆ.

B'. Body more or less compressed. Rostrum usually compressed. Pleon elongate, not inflexed; appendages oar-shaped. Articulation between the carpus and propodus at only one fixed point.
Tribe CARIDEA.

C. First three pairs of legs chelate; rostrum laterally compressed.
Family PENÆIDÆ.

C'. First three pairs of legs not all chelate.

D. Rostrum long; first and second pairs of legs chelate; last three pairs simple.

E. Second pair of legs with carpal joint undivided. Sometimes fluviatile.
Family PALÆMONIDÆ.

E'. Second pair of legs with carpal joint divided into segments.
Family HIPPOLYTIDÆ.

D'. Rostrum very small or absent.

E. Eyestalks short, more or less covered by the projection of the front margin of the carapace; first pair of legs robustly chelate, sometimes unsymmetrical; second pair long and slender, minutely chelate.....Family ALPHEIDÆ.

E'. Eyestalks not covered by the front margin of the carapace.

F. First and second pairs of legs distinctly chelate, with spoon-shaped fingers. Fluviatile.....Family ATYIDÆ.

F'. First and second pairs of legs more or less chelate. Fingers not spoon-shaped. Marine.....Family CRANGONIDÆ.

Suborder BRACHYURA.

Tribe CATOMETOPA.

Family OCYPODIDÆ.

KEY TO THE WEST AFRICAN GENERA OF THE FAMILY OCYPODIDÆ.

A. Carapace quadrate; sides entire; front narrow; orbits occupying nearly the whole width of the carapace.

B. Eye peduncles large; chelæ in male somewhat unequal.....*Ocypode.*

B'. Eye peduncles slender; chelæ in male extremely unequal.....*Uca.*

A'. Carapace with arcuate anterior margins; front and orbits of moderate width.

B. Antero-lateral margins distinctly dentate.....*Pilumnoplax.*

B'. Antero-lateral margins obscurely lobate.....*Typhlocarcinus.*

Genus OCYPODE Fabricius.

KEY TO THE WEST AFRICAN SPECIES OF THE GENUS OCYPODE.

A. Eyes terminated by a short style ..... *ippeus.*
A'. Eyes without terminal style ..... *africana.*

OCYPODE IPPEUS Olivier.

Ocypode ippeus OLIVIER, Voy. Empire Ottoman, IV, 1804, p. 52; Atlas, Pt. 2, pl. XXX, fig. 1.
Ocypode cursor MILNE-EDWARDS, Ann. Sci. Nat. (3), Zool., XVIII, 1852, p. 142 (= ? *Cancer cursor* Linnæus).

Range.—Greece (Guérin); Syria (Olivier); Egypt (Lamarck); African coast of the Mediterranean (Desmarest); West African coast.

West African localities.—Cape Verde Islands (Stimpson, Miers, Studer); Cape Verde (Milne-Edwards); Senegal (Kingsley); Rufisque, Senegal (Hilgendorf); Dakar, Senegal (O. F. Cook); Mouth of Mesurado River, Monrovia (O. F. Cook); Liberia (Studer); Acra d'Elmina (de Man); St. Thomas, at Iogo-Iogo, Diogo Nunes, Praia das Conchas, Praia Almoxarife (Osorio); St. Thomas (Vieira, teste Osorio); Ile du Prince (Osorio); Kongo coast (de Man, Studer); St. Paul de Loanda (Studer, Benedict); Angola, at Benguella, Novo Redondo and Lobito (Osorio).

OCYPODE AFRICANA de Man.

Ocypode africana DE MAN, Notes Leyden Mus., III, 1881, p. 253.
Ocypode hexagonura HILGENDORF, SB. Ges. Natur. Freunde Berlin, 1882, p. 23.
Ocypode edwardsi OSORIO, Jor. Sci. Lisboa (2), II, 1890, p. 48.

West African localities.—Rufisque, Senegal (Hilgendorf); Mouth of Mesurado River, Monrovia (O. F. Cook); Liberia (Hilgendorf); Grand Cape Mount, Liberia (de Man); Ile du Prince (Osorio); Kongo coast (de Man); Loango (Hilgendorf); Muserra (de Man).

Genus PILUMNOPLAX Stimpson.

PILUMNOPLAX SULCATIFRONS ATLANTICA Miers.

Pilumnoplax sulcatifrons var. *atlantica* MIERS, Ann. Mag. N. H. (5), VIII, 1881, p. 259.

West African locality.—Goree Bay, Senegambia, 9 to 15 fathoms (Miers).

Genus TYPHLOCARCINUS Stimpson.

TYPHLOCARCINUS INTEGRIFRONS Miers.

Typhlocarcinus integrifrons MIERS, Ann. Mag. Nat. Hist. (5), VIII, 1881, p. 260, pl. XIV, fig. 1.

West African locality.—Goree Bay, Senegambia, 9 to 15 fathoms (Miers).

Genus UCA Leach.

KEY TO THE WEST AFRICAN SPECIES OF THE GENUS UCA.

A. Carapace tuberculate; front narrow ..... *tangeri.*
A'. Carapace smooth; front broad ..... *mordax.*

UCA TANGERI (Eydoux).

Gelasimus tangeri EYDOUX, Mag. de Zool., 1835, Cl. VII, pl. XIV.
Gelasimus perlatus HERKLOTS, Addit. Fauna Afr. Occ., 1851, p. 6, pl. I, fig. 3.
Gelasimus cimatodus ROCHEBRUNE, Bull. Soc. Philom. Paris (7), VII, 1883, p. 171.
Uca tangieri ORTMANN, Zool. Jahrb., Syst., X, 1897, p. 356.

The *perlatus* form of this species differs from typical *tangeri* only in the great reduction of the larger cheliped of the male and its comparative smoothness, there being no tubercular ridges on the inner side of the palm. The single male of *perlatus* in the U. S. National Museum collection, from St. Paul de Loanda, appears to be an aborted *tangeri*.

Range.—From Portugal (Capello, Osorio), to north and west coasts of Africa, as far as Algiers and Angola; West Indies (Miers); ? Bahia (Kingsley).

West African localities.—Rufisque, Senegal (Hilgendorf); Dakar, (O. F. Cook); Goree Bay, 9 to 15 fathoms (Miers); Sierra Leone (Miers); Rock Spring, Monrovia (O. F. Cook); mouth of Mesurado River (O. F. Cook); Liberia (Hilgendorf); Grand Bassam (Studer); Guinea (Kingsley); Beyah River, Ashantee (Benedict); near Boutry, Guinea (Herklots); Lagos (Studer); Bibundi, Kamerun (Aurivillius); St. Thomas, at Iogo-Iogo, and Praia Almoxarife (Osorio); Ogove (Thallwitz); Chinchoxo (Hilgendorf, Studer); mouth of the Kwilu River (Berlin Mus.); mouth of the Kongo (Studer); Loanda (Hilgendorf, Studer); St. Paul de Loanda (Benedict); Barre du Dande, Benguella and Lobito (Osorio); "Les deux Mamelles" and "Côté des Maringouins pointe des Chameaux" (Rochebrune).

UCA MORDAX (Smith)?

Gelasimus mordax SMITH, Trans. Conn. Acad. Sci., II, 1870, p. 135, pl. II, fig. 3; pl. IV, figs. 4, 4*a*.

Range.—Bahamas to Rio de Janeiro. West Africa?

West African locality.—Liberia (O. F. Cook, collector); one small but mature female.

This single specimen is very like females of *Uca mordax* from America. Its identity can not be determined with certainty until the male is discovered.

Dimensions.—Length, 8.6 mm.; width, 12.6 mm.

Family GECARCINIDÆ.

KEY TO THE WEST AFRICAN GENERA OF THE FAMILY GECARCINIDÆ.

A. Palpus of the outer maxillipeds inserted on the inner face of the third joint near its summit and concealed under the joint ..... *Gecarcinus.*
A'. Palpus of the outer maxillipeds inserted at the external angle of the third joint and exposed to view ..... *Cardisoma.*

Genus GECARCINUS Leach.

GECARCINUS LAGOSTOMA Milne-Edwards.

Gecarcinus lagostoma MILNE-EDWARDS, Hist. Nat. Crust., II, 1837, p. 27.

Range.—Australasia (Milne-Edwards, Miers); South and West Africa; Bermuda? (Miers).

African localities.—West Africa (Miers); St. Thomas and Rolas (Greeff, as *ruricola;* Osorio, as *ruricola*); Benguella, Angola (Osorio); Cape of Good Hope (Miers); Ascension Island (Drew, Miers, Benedict, Ortmann).

Genus CARDISOMA Latreille.

CARDISOMA ARMATUM Herklots.

Cardisoma armatum HERKLOTS, Addit. Fauna Afr. Occ., 1851, p. 7, pl. 1, figs. 4, 5.

West African localities.—St. Jago, Cape Verde Islands (Stimpson, as *C. guanhumi*), Cat. No. 2037, U.S.N.M.; Porto Praya, St. Jago, Cape Verde Islands (Miers); Rufisque, Senegal (Hilgendorf); Dakar, Senegal (O. F. Cook); St. George del Mina, and near Boutry, Guinea (Herklots); Lagos (Ortmann, as *C. guanhumi*), Bibundi, Kamerun (Aurivillius); St. Thomas and Rolas (Greeff, as *C. guanhumi*); Ribeira Peixe, St. Thomas (Osorio); Ogove (Thallwitz); Benguella, Novo Redondo, Lobito, and Koroka River (Osorio).

Family GRAPSIDÆ.

KEY TO THE WEST AFRICAN GENERA AND SUBGENERA OF THE FAMILY GRAPSIDÆ.

A. Antennæ covered by the front.
  B. External maxillipeds without a piliferous ridge.
    C. Antennæ excluded from the orbit.
      D. Merus of maxillipeds as long as ischium ..... *Goniopsis.*
      D′. Merus of maxillipeds shorter than ischium ..... *Metopograpsus.*
    C′. Antennæ entering the orbit.
      D. Merus of maxillipeds longer than broad ..... *Grapsus.*
      D′. Merus of maxillipeds as broad as long.
        E. Outer surface of palm of large chela quite flat, and prolonged proximally beyond the wrist ..... *Platychirograpsus.*
        E′. Outer surface of palm not flattened and prolonged.
          F. Carapace longer than broad ..... *Planes.*
          F′. Carapace transverse ..... *Pachygrapsus.*
  B′. External maxillipeds with a piliferous ridge ..... *Sesarma.*
    C. Sides arcuate ..... Subgenus *Sarmatium.*
    C′. Sides straight.
      D. Sides with a tooth behind orbital tooth. Manus with pectinated ridges above ..... Subgenus *Perisesarma.*
      D′. Sides entire.
        E. Manus without pectinated ridges above ..... Subgenus *Holometopus.*
        E′. Manus with pectinated ridges above ..... Subgenus *Parasesarma.*
A′. Antennæ visible from above.
  B. Merus of maxillipeds large, as broad as ischium ..... *Plagusia.*
  B′. Merus of maxillipeds small, much narrower than ischium ..... *Percnon.*

Genus GONIOPSIS de Haan.

GONIOPSIS CRUENTATA (Latreille).

Grapsus cruentatus LATREILLE, Hist. Nat. Crust., VI, 1803, p. 70.
Grapsus (Goniopsis) cruentatus DE HAAN, Fauna Japon., 1835, p. 33.
Grapsus pelii HERKLOTS, Addit. Fauna Afr. Occ., 1851, p. 8, pl. 1, figs. 6, 7.

Range.—Bahamas and Florida Keys to Rio de Janeiro; Bermudas; West Africa; west coast of Nicaragua (Kingsley).

West African localities.—Dakar (O. F. Cook, collector); Rock Spring, Monrovia (O. F. Cook, collector); mouth of Mesurado River (O. F. Cook, collector); Liberia (von Martens); Ashantee (Benedict); Boutry, Guinea (Herklots); Princes Island (Osorio); St. Thomas, at Iogo-Iogo, Praia das Conchas, and Binda (Osorio); Gabun (Kingsley); Ogove (Thallwitz); Angola and Lobito (Osorio).

Genus METOPOGRAPSUS Milne-Edwards

METOPOGRAPSUS MESSOR (Forskål).

Cancer messor FORSKÅL, Desc. Anim. Itin. Or., 1775, p. 88.
Metopograpsus messor MILNE-EDWARDS, Ann. Sci. Nat. (3), XX, 1853, p. 165.

Range.—Oriental region; West Africa.

West African localities.—Canaries (Brullé); St. Thomas (Osorio); Angola (Osorio).

Genus GRAPSUS Lamarck.

GRAPSUS GRAPSUS (Linnæus).

Cancer grapsus LINNÆUS, Sys. Nat., 10th ed., I, 1758, p. 630.
Cancer (Grapsus) grapsus LATREILLE, Règne Anim. Cuvier, III, 1817, p. 16.
Grapsus grapsus IVES, Proc. Acad. Nat. Sci. Phila., 1891, p. 190.

Range.—Throughout the Tropics.

West African localities.—Madeira (Dana, Stimpson); Canary Islands (Milne-Edwards); Cape Verde Islands (Dana, Stimpson, Miers, Benedict); Ascension Island (Miers, Benedict, Ortmann); Rufisque, Senegal (Hilgendorf); Liberia (de Man); St. Thomas Island, at Ribeira Peixe, Praia Almoxarife, Praia das Conchas, and Angolares (Osorio); Angola, at Benguella and Koroka River (Osorio).

Genus PACHYGRAPSUS Randall.

PACHYGRAPSUS TRANSVERSUS Gibbes.

Pachygrapsus transversus GIBBES, Proc. Amer. Assoc. Adv. Sci., III, 1850, p. 181.
Leptograpsus rugulosus MILNE-EDWARDS, Ann. Sci. Nat. (3), XX, 1853, p. 172 [138].

Range.—Bahamas and Florida Keys to Rio Janeiro; Bermudas; West Africa; Oriental region (Australia, New Zealand, Singapore, Tahiti); California; Gulf of California; Gulf of Fonseca; west coast of Central America; Peru; Galapagos Islands.

West African localities.—Madeira (Stimpson, Miers); Cape Verde Islands (Miers, Benedict); Loanda (Hilgendorf).

This species is quite distinct from *P. maurus* Lucas (= *Goniograpsus*

simplex Dana), which can be told most readily by its narrower carapace, with sides slightly converging posteriorly, and by the entire lower extremity of the meri of the last pair of feet. There is a specimen of *P. maurus* in the U. S. National Museum from Terceira, Azores, collected by William Trelease. It is also known from Algiers (type locality); Oran (Milne-Edwards); Madeira (Stimpson); Rio Janeiro (Dana, Heller).

It is possible that *Grapsus simplex* Herklots, from Boutry, Guinea, is a synonym of *Pachygrapsus maurus* Lucas.

Genus PLANES Leach.

PLANES MINUTUS (Linnæus).

Cancer minutus LINNÆUS, Sys. Nat., 10th ed., I, 1758, p. 625.
Planes clypeatus BOWDICH, Excursions in Madeira and Porto Santo, 1825, p. 15, pl. XII, figs. 2*a*, 2*b*.
Planes minutus WHITE, List Crust. Brit. Mus., 1847, p. 42.

Range.—In all tropical and temperate seas.

West African localities.—Canary Islands (Miers); Rio Gambia (Kingsley).

Genus PLATYCHIROGRAPSUS de Man.

PLATYCHIROGRAPSUS SPECTABILIS de Man.

Platychirograpsus spectabilis DE MAN, Zool. Anz., No. 506, 1896, p. 292; Jahrb. Hamburg. Wissen. Anst., XII, 1896, p. 97, pl. II, figs. 4, 4*a*, *b*, *d*; pl. III, fig. 4*c*.
Aspidograpsus typicus KRØYER, manuscript (Copenhagen Museum).

Range.—Mexico; West Africa. One specimen was received from the Mexican Commission at the World's Columbian Exposition, 1893 (U.S.N.M.). Bay of Mexico, one male (Copenhagen Mus.). A claw of this rare species was discovered by the writer among a collection of deformed lobster claws in the museum at Halifax, Nova Scotia; its origin is unknown.

West African locality.—Gabun (de Man).

Genus SESARMA Say.

Subgenus HOLOMETOPUS Milne-Edwards.

KEY TO THE WEST AFRICAN SPECIES OF THE SUBGENUS HOLOMETOPUS.

A. Upper margin of front concave and deeply four-lobed ..... *roberti*.
A'. Upper margin of front straight and nearly undivided ..... *elegans*.

SESARMA (HOLOMETOPUS) ROBERTI Milne-Edwards.

Sesarma roberti MILNE-EDWARDS, Ann. Sci. Nat. (3), XX, 1853, p. 182 [148].
Sesarma americana POCOCK, Ann. Mag. Nat. Hist. (6), III, 1889, p. 7. Not *S. americana* Saussure.
Sesarma bromeliarum RATHBUN, Proc. U. S. Nat. Mus., XIX, 1896, p. 143.

Range.—West Indies: Haiti; Jamaica; Puerto Rico (Cat. No. 4801, Berlin Mus.); Laiou, Dominica (Pocock); Martinique (Paris Mus.); St. Lucia. West Africa.

West African locality.—Goree, Senegal (Milne-Edwards)

SESARMA (HOLOMETOPUS) ELEGANS Herklots.

Sesarma elegans HERKLOTS, Addit. Fauna Afr. Occ., 1851, p. 10, pl. 1, fig. 10.—DE MAN, Notes Leyden Mus., I, 1879, p. 69.

West African localities.—Near Boutry, Guinea (Herklots); Ogove (Thallwitz).

Subgenus PARASESARMA de Man.

KEY TO THE WEST AFRICAN SPECIES OF THE SUBGENUS PARASESARMA.

A. Outer surface of hand perfectly flat and smooth ..... *büttikoferi.*
A'. Outer surface of hand not perfectly flat and smooth ..... *angolensis.*

SESARMA (PARASESARMA) BÜTTIKOFERI de Man.

Sesarma büttikoferi DE MAN, Notes Leyden Mus., V, 1883, p. 163.

West African localities.—Rock Spring, Monrovia (O. F. Cook, collector); Fisherman Lake, Liberia (de Man); Gunk River, Liberia (U.S.N.M.); Bibundi, Kamerun, in brackish water at the mouth of the river Bekongolo (Aurivillius); river N'Dian, Kamerun, brackish water (Aurivillius); Ogove (Thallwitz).

SESARMA (PARASESARMA) ANGOLENSIS Capello.

Sesarma angolensis CAPELLO, Desc. tres esp. nov. Crust. Afr. Occ., Lisboa, 1864, p. 4, fig. 2; Mem. Acad. R. Sci. Lisboa, Cl. Sci. Nat., Nova Ser., II, 1865, Pt. 2.

West African localities.—Grand Cape Mount, Liberia (de Man); Kamerun, at Bibundi on land, and river N'Dian, brackish water (Aurivillius); Ponte da Leuha, Kongo (Studer); Sea of Angola (Capello); Angola (Osorio).

Subgenus PERISESARMA de Man.

KEY TO THE WEST AFRICAN SPECIES OF THE SUBGENUS PERISESARMA.

A. External surface of palm rising to an acute tubercle, situated near the external inferior angle ..... *kamermani.*
A'. External surface of palm regularly convexly arched ..... *africanum.*

SESARMA (PERISESARMA) KAMERMANI de Man.

Sesarma kamermani DE MAN, Notes Leyden Mus., V, 1883, p. 165.

West African locality.—Muserra, Kongo (de Man).

SESARMA (PERISESARMA) AFRICANUM Milne-Edwards.

Sesarma africana MILNE-EDWARDS, Hist. Nat. Crust., II, 1837, p. 73; Ann. Sci. Nat. (3), XX, 1853, p. 185 [151].

Range.—Barbados (Paris Mus.); West Africa.

West African localities.—Senegal (Milne-Edwards); Rock Spring, Monrovia (O. F. Cook, collector); Liberia (de Man); Beyah River, Ashantee (Benedict); near Boutry, Guinea (Herklots); Ekundu and Bibundi, Kamerun (Aurivillius); Gabun (Paris Mus.); Ogove (Thallwitz); Benguella (Osorio).

Subgenus **SARMATIUM** Dana.

SESARMA (SARMATIUM) CURVATUM Milne-Edwards.

Sesarma curvata MILNE-EDWARDS, Hist. Nat. Crust., II, 1837, p. 75.
Sesarma violacea HERKLOTS, Addit. Fauna Afr. Occ., 1851, p. 10, pl. 1, fig. 9.—DE MAN, Notes Leyden Mus., II, 1880, p. 31.
Metagrapsus curvatus MILNE-EDWARDS, Ann. Sci. Nat. (3), XX, 1853, p. 189 [155].
Sarmatium curvatum KINGSLEY, Proc. Acad. Nat. Sci. Phila., 1880, p. 212.

West African localities.—Senegal (Milne-Edwards); near Boutry, Guinea (Herklots); Boutry and Saccondi (de Man); Ogove (Thallwitz); Lobito (Osorio); West Africa (Kingsley).

Genus PLAGUSIA Latreille.

KEY TO THE WEST AFRICAN SPECIES OF THE GENUS PLAGUSIA.

A. Carapace tuberculate ..... *depressa.*
A'. Carapace smooth ..... *delaunayi.*

PLAGUSIA DEPRESSA (Fabricius).

Cancer depressus FABRICIUS, Sys. Ent., 1775, p. 406.
Plagusia depressus SAY, Jour. Acad. Nat. Sci. Phila., I, 1817, p. 100.

Range.—From Charleston, South Carolina, to Brazil; from the Mediterranean to St. Helena and South Africa.

African localities.—Madeira (Osorio); Cape Verde Islands (Osorio); St. Vincent, Cape Verde Islands (Miers); Rufisque, Senegal (Hilgendorf); Senegambia (Herklots, as *P. squamosa*); Liberia, Saccondi and Acra d'Elmina (de Man); Beyah River, Ashantee (Benedict); near Boutry, Guinea (Herklots, as *P. squamosa*); St. Thomas Island (Osorio); Angola (Osorio); Natal (Herklots, as *P. squamosa*).

PLAGUSIA DELAUNAYI Rochebrune.

Plagusia delaunayi ROCHEBRUNE, Bull. Soc. Philom., Paris (7), VII, 1883, No. 4, p. 172.

West African localities.—Ile aux Chiens, Albreda; Gambia (Rochebrune).

Genus PERCNON Gistel.[1]

PERCNON PLANISSIMUM (Herbst).

Cancer planissimus HERBST, Natur. Krabben u. Krebse, III, 1804, Pt. 4, p. 3, pl. LIX, fig. 3.
Leiolophus planissimus MIERS, Cat. Crust. New Zealand, 1876, p. 46.

Range.—West Indian region; Oriental region to Japan and Sandwich Islands; Clarion Island; Cape St. Lucas; Chile; Azores; West coast of Spain and Portugal; West and South Africa.

African localities.—Madeira (Brullé, Dana, Miers); Canaries (Brullé); Praia das Conchas, St. Thomas Island (Osorio); Ascension Island (Miers); Cape of Good Hope (Ortmann).

[1] *Percnon* Gistel, Naturgeschichte des Thierreichs, Stuttgart, 1848, p. VIII, substituted for *Acanthopus* de Haan, preoccupied.

Family PINNOTHERIDÆ.

Genus THAUMASTOPLAX Miers.

THAUMASTOPLAX ANOMALIPES Miers.

Thaumastoplax anomalipes MIERS, Ann. Mag. N. H. (5), VIII, 1881, p. 261, pl. XIV, fig. 2.

West African locality.—Goree Bay, Senegambia, 9 to 15 fathoms (Miers).

Tribe CYCLOMETOPA.

Family POTAMONIDÆ.

KEY TO THE WEST AFRICAN GENERA AND SUBGENERA OF THE FAMILY POTAMONIDÆ.

A. Ambulatory legs with anterior margin of carpal and propodal joints unarmed.
  B. Lateral margin of carapace armed with large and sharp teeth or spines. Genus *Parathelphusa*.
  B′. Lateral margin of carapace entire, toothed or granulate.....Genus *Potamon*.
    C. Postfrontal crest present and uninterrupted .....Subgenus *Potamonautes*.
    C′. Postfrontal crest absent .....Subgenus *Geothelphusa*.
A′. Ambulatory legs armed with numerous spines on the anterior margin. Genus *Erimetopus*.

Genus POTAMON Savigny.

Subgenus POTAMONAUTES MacLeay.

KEY TO THE WEST AFRICAN SPECIES OF THE SUBGENUS POTAMONAUTES.

A. Lateral margin of carapace with a tooth between the outer orbital tooth and the postfrontal crest.
  B. Postfrontal crest terminating in a well-marked tooth .....*africanus*.
  B′. Tooth rudimentary or wanting.
    C. A groove separates the postfrontal crest from the lateral margin of the carapace .....*aubryi*.
    C′. Postfrontal crest and lateral margin continuous.....*decazei*.
A′. Lateral margin of carapace without a tooth between the outer orbital tooth and the postfrontal crest.
  B. Epibranchial tooth strong, produced.
    C. Postfrontal crest arcuate, more advanced at its middle than the epibranchial tooth.
      D. Carapace very thick, swollen.....*bayonianus*
      D′. Carapace less thick, swollen; front narrower; a deeper sinus between the postfrontal crest and the epibranchial tooth .....*dubius*.
    C′. Postfrontal crest sinuous, its middle portion about equally advanced with the epibranchial tooth .....*ballayi*.[1]
  B′. Epibranchial tooth nearly obsolete, not produced.
    C. Carapace flattened; postfrontal crest not prominent.....*margaritarius*.
    C′. Carapace very convex.
      D. Postfrontal crest sloping backward from the middle to the lateral margins .....*perlatus*.
      D′. Postfrontal crest sinuous.....*anchietæ*.

[1] According to the figure of this species, the postfrontal crest is uninterrupted.

POTAMON (POTAMONAUTES) AFRICANUS (A. Milne-Edwards).

Thelphusa africana A. MILNE EDWARDS, Nouv. Arch. Mus. Hist. Nat., V, 1869, p. 186, pl. XI, figs. 2, 2*a*; Ann. Sci. Nat., Zool. (7), IV, 1887, p. 124, fig. 8.

Potamon (*Potamonautes*) *aubryi* ORTMANN (part), Zool. Jahrb., Syst., X, 1897, p. 309.

West African localities.—Rivers of Liberia (de Man); Mount Coffee, Liberia (O. F. Cook; U.S.N.M.); Kamerun (Aurivillius); Gabun (A. Milne-Edwards); the San Benito, the Ogove, the Alima, the Kongo (A. Milne-Edwards).

POTAMON (POTAMONAUTES) DECAZEI (A. Milne-Edwards).

Thelphusa decazei A. MILNE-EDWARDS, Bull. Soc. Philom. (7), X, 1886, p. 150; Ann. Sci. Nat., Zool., (7), IV, 1887, p. 127, fig. 7.

Potamon (*Potamonautes*) *decazei* ORTMANN, Zool. Jahrb., Syst., X, 1897, p. 309.

West African localities.—The San Benito, Franceville on the Alima (A. Milne-Edwards).

POTAMON (POTAMONAUTES) AUBRYI (Milne-Edwards).

Thelphusa aubryi MILNE-EDWARDS, Ann. Sci. Nat. (3), XX, 1853, p. 210.—A. MILNE-EDWARDS (part), Ann. Sci. Nat., Zool. (7), IV, 1887, p. 122.

Thelphusa aurantia HERKLOTS, Addit. Faun. Afr. Occ., 1851, p. 5, pl. I, fig. 2. (Not *Cancer aurantius* Herbst.)

Thelphusa pelii HERKLOTS, Symb. Carc., Leyden, 1861, p. 13.

Thelphusa emarginata KINGSLEY, Proc. Acad. Nat. Sci. Phila., 1880, p. 36.

Potamon (*Potamonautes*) *aubryi* ORTMANN (part), Zool. Jahrb., Syst., X, 1897, p. 309.

Potamon (*Potamonautes*) *emarginatum* ORTMANN, Zool. Jahrb., Syst., X, 1897, p. 309.

African localities.—St. George-del-Mina, Guinea (Herklots); Kamerun (Aurivillius); Gabun (Milne-Edwards); West Africa (Kingsley); Port Natal (Kingsley).

POTAMON (POTAMONAUTES) MARGARITARIUS (A. Milne-Edwards).

Thelphusa margaritaria A. MILNE-EDWARDS, Nouv. Arch. Mus. Hist. Nat., V, 1869, p. 185, pl. IX, figs. 4, 4*a*, 4*b*; Ann. Sci. Nat., Zool. (7), IV, 1887, p. 130.

Potamon (*Potamonautes*) *margaritarium* ORTMANN, Zool. Jahrb., Syst., X, 1897, p. 308.

Habitat.—St. Thomas, off west coast of Africa (A. Milne-Edwards). The following localities on the island have been noted: Ribeira Peixe; Portinho, 400 meters altitude; Bindá; Batepá; Saudade, 750 meters altitude; River Agua Grande (Osorio); Rio de Mello, 300 meters (Greeff).

POTAMON (POTAMONAUTES) ANCHIETÆ (Capello).

Thelphusa anchietæ CAPELLO, Jor. Sci. Lisboa, III, 1870, p. 132, pl. II*a*, fig. 11.—A. MILNE-EDWARDS, Ann. Sci. Nat., Zool. (7), IV, 1887, p. 128.

Potamon (*Potamonautes*) *perlatum* ORTMANN (part), Zool. Jahrb., Syst., X, 1897, p. 307.

West African localities.—Braganca; Ambaka; Pungo-Ndongo; Dondo (all in Angola). Luebo, Kongo; D. W. Snyder (U.S.N.M.). Quilengues and Quando (Osorio).

POTAMON (POTAMONAUTES) DUBIUS (Capello).

Thelphusa dubia CAPELLO, Jor. Sci. Lisboa, IV, 1873, p. 254, pl. 1, figs. 1*a*, 2*a*.—A. MILNE-EDWARDS, Ann. Sci. Nat., Zool. (7), IV, 1887, p. 129.

Potamon (Potamonautes) dubium ORTMANN, Zool. Jahrb., Syst., X, 1897, p. 307.

African localities.—St. Thomas (Osorio); Kunene River, Mossamedes (Capello); Angola, Humbe, and Kunene River (Osorio); Kazungula, Zambesi (U.S.N.M.).

POTAMON (POTAMONAUTES) BAYONIANUS (Capello).

Thelphusa bayoniana CAPELLO, Desc. tres esp. nov. Crust. Afr. occ., Lisboa, 1864, p. 2, pl. 1, fig. 3; Mem. Acad. R. Sci. Lisboa, Cl. Sci., Nova Ser., II, 1865, Pt. 2; Jor. Sci. Lisboa, III, 1870, p. 131, pl. 2*a*, fig. 10.—A. MILNE-EDWARDS, Ann. Sci. Nat., Zool. (7), IV, 1887, p. 128.

Potamon (Potamonautes) bayonianum ORTMANN, Zool. Jahrb., Syst., X, 1897, p. 306.

African localities.—Angola: To the north of Quibula; Duque de Braganca; Kakonda; Huilla; Kunene River (Osorio).

POTAMON (POTAMONAUTES) BALLAYI (A. Milne-Edwards).

Thelphusa ballayi A. MILNE-EDWARDS, Bull. Soc. Philom. (7), X, 1886, p. 149; Ann. Sci. Nat., Zool. (7), IV, 1887, p. 132, figs. 2, 2*a*, 2*b*.

African locality.—Ngancin on the Kongo (A. Milne-Edwards).

POTAMON (POTAMONAUTES) PERLATUS (Milne-Edwards).

Thelphusa perlata MILNE-EDWARDS, Hist. Nat. Crust., II, 1837, p. 13.

Potamon (Potamonautes) perlatum ORTMANN (part), Zool. Jahrb., Syst., X, 1897, p. 307.

African localities.—Zanzibar and Zanzibar coast (Pfeffer); Natal (Krauss, Ortmann); Cape Colony (Milne-Edwards, Krauss, Heller); Constantia (Stimpson); Cape Town (Miers); Wellington (Miers); Chalk Bay (Studer); Biballa and Caconda (Osorio); 400 miles inland from Loanda in River Cuiji—H. Chatelain, collector (U.S.N.M.). "Found in ponds and swamps; eaten by the natives; called 'Hala.'"

Subgenus GEOTHELPHUSA Stimpson.

POTAMON (GEOTHELPHUSA) MACROPUS Rathbun.

Potamon (Geothelphusa) macropus RATHBUN, Proc. Biol. Soc. Washington, XII, 1898, p. 29, pl. II, figs. 1–4.

African locality.—Mouth of Mesurado River, Monrovia; O. F. Cook, collector.

Genus PARATHELPHUSA Milne-Edwards.

KEY TO THE WEST AFRICAN SPECIES OF THE GENUS PARATHELPHUSA.

A. Lateral margin with only one tooth behind the post-frontal crest.....*charanesi*.
A'. Lateral margin with more than one tooth behind the post-frontal crest.
  B. Lateral margin with more than three teeth behind the post-frontal crest.
    C. Carapace narrow; post-frontal crest feeble.....*brazzæ*.
    C'. Carapace broad; post-frontal crest distinct.....*chaperi*.
  B'. Lateral margin with only three teeth behind the post-frontal crest.
    C. Post-frontal crest uninterrupted, nearly straight.....*pœcilei*.
    C'. Post-frontal crest arcuate, uneven, interrupted.....*campi*.

PARATHELPHUSA BRAZZÆ A. Milne-Edwards.

Parathelphusa brazzæ A. MILNE-EDWARDS, Bull. Soc. Philom. (7), X, 1886, p. 148; Ann. Sci. Nat., Zool. (7), IV, 1887, p. 142, fig. 6.
Potamon (*Acanthothelphusa*) *brazzæ* ORTMANN, Zool. Jahrb., Syst., X, 1897, p. 300.

West African locality.—Ngancin, Kongo (A. Milne-Edwards).

PARATHELPHUSA CHAPERI A. Milne-Edwards.

Parathelphusa chaperi A. MILNE-EDWARDS, Ann. Sci. Nat., Zool. (7), IV, 1887, p. 144, fig. 4.

West African locality.—Assini (A. Milne-Edwards).

PARATHELPHUSA PÆCILEI A. Milne-Edwards.

Thelphusa pœcilei A. MILNE-EDWARDS, Bull. Soc. Philom. (7), X, 1886, p. 149.
Parathelphusa pœcilei A. MILNE-EDWARDS, Ann. Sci. Nat., Zool. (7), IV, 1887, p. 143, fig. 1.
Potamon (*Acanthothelphusa*) *pœcilei* ORTMANN, Zool. Jahrb., Syst., X, 1897, p. 300.

West African locality.—Alima River, Bateke, French Kongo (A. Milne-Edwards).

PARATHELPHUSA CAMPI Rathbun.

Parathelphusa campi RATHBUN, Proc. U. S. Nat. Mus., XVII, 1894, p. 25.
Potamon (*Acanthothelphusa*) *campi* ORTMANN, Zool. Jahrb., Syst., X, 1897, p. 300.

West African locality.—Stanley Pool, Kongo.

PARATHELPHUSA CHAVANESI A. Milne-Edwards.

Thelphusa chavanesi A. MILNE-EDWARDS, Bull. Soc. Philom. (7), X, 1886, p. 150.
Parathelphusa chavanesi A. MILNE-EDWARDS, Ann. Sci. Nat., Zool. (7), IV, 1887, p. 145, fig. 3.
Potamon (*Potamonautes*) *chavanesi* ORTMANN, Zool. Jahrb., Syst., X, 1897, p. 309.

West African locality.—Environs of Franceville on the Alima, French Kongo (A. Milne-Edwards).

Genus ERIMETOPUS Rathbun.

ERIMETOPUS SPINOSUS Rathbun.

Erimetopus spinosus RATHBUN, Proc. U. S. Nat. Mus., XVII, 1894, p. 26.

West African locality.—Stanley Pool, Kongo; under boards and timbers, in mud.

Family PILUMNIDÆ.

KEY TO THE WEST AFRICAN GENERA OF THE FAMILY PILUMNIDÆ.

A. The ridges that define the efferent branchial channels, if present, are low and are confined to the posterior part of the endostome, never reaching to the anterior boundary of the buccal cavern.
B. Fronto-orbital border hardly ever (in adults) more than half, most usually much less than half, the greatest width of the carapace.
C. Antero-lateral margin continued to the angle of the buccal cavity; carapace eroded ..... *Glyptoxanthus*

C'. Antero-lateral margin ending at the orbit.
D. Ambulatory legs cristate ..... *Lophopanopeus.*
D'. Ambulatory legs not cristate.
E. Carapace deeply lobulate ..... *Actæa.*
E'. Carapace not deeply lobulate.
F. Fingers sharp-pointed; carapace subhexagonal ..... *Xantho.*
F'. Fingers blunt-pointed, hollowed at the tip.
G. Carapace very broad, oval; antero-lateral margin thickened. *Xanthodius.*
G'. Carapace of moderate width, suboval; front and antero-lateral margins not thickened ..... *Leptodius.*
B'. Fronto-orbital border much more than half the greatest width of the carapace.
C. Fingers pointed at tips.
D. Carapace and legs granulate or tuberculate ..... *Xanthias.*
D'. Carapace almost smooth, except for short transverse lines. Legs smooth. *Eupanopeus.*
C'. Fingers hollowed at tip ..... *Chlorodiella.*
A'. The ridges that define the efferent branchial channels extend to the anterior boundary of the buccal cavern, and are often very strong.
B. Fronto-orbital borders half or less than half the greatest breadth of the carapace, which is broad and transversely oval ..... *Epixanthus.*
B'. Fronto-orbital border just about two-thirds the greatest breadth of the carapace. Antero-lateral borders almost always shorter than the postero-lateral ..... *Pilumnus.*

Genus ACTÆA de Haan.

ACTÆA MARGARITARIA A. Milne-Edwards.

Actæa margaritaria A. MILNE-EDWARDS, Nouv. Arch. Mus. Hist. Nat. Paris, IV, 1868, p. 62, pl. XVII, figs. 9–12.

West African localities.—Cape Verde Islands (A. Milne-Edwards); Iogo-Iogo, St. Thomas (Osorio).

Genus XANTHO Leach.

KEY TO THE WEST AFRICAN SPECIES OF THE GENUS XANTHO.

A. Carapace wide; width more than 1½ its length ..... *rivulosus.*
A'. Carapace narrow; width less than 1½ its length ..... *pilipes.*

XANTHO RIVULOSUS (Risso).

Cancer rivulosus RISSO, Crust. Nice, 1816, p. 14.
Xantho rivulosus MILNE-EDWARDS, Hist. Nat. Crust., I, 1834, p. 394.

Range.—Great Britain; Atlantic coast of Europe; Black Sea; Mediterranean Sea; West coast of Africa.
West African locality.—Angola (Osorio).

XANTHO PILIPES A. Milne-Edwards.

Xantho pilipes A. MILNE-EDWARDS, Ann. Soc. Entom. France, VII, 1867, p. 268.
Xantho pilipes? MIERS, Ann. Mag. Nat. Hist. (5), VIII, 1881, p. 213.

West African localities.—Senegal (A. Milne-Edwards); Goree Bay, Senegambia, 9 to 15 fathoms (Miers); Senegambia (Ortmann).

Genus XANTHODIUS Stimpson.

XANTHODIUS PUNCTATUS (Miers).

Leptodius punctatus MIERS, Ann. Mag. Nat. Hist. (5), VIII, 1881, p. 214, pl. XIII, fig. 3.

West African locality.—Goree Bay, Senegambia, 9 to 15 fathoms (Miers).

Genus LEPTODIUS A. Milne-Edwards.

LEPTODIUS CONVEXUS (A. Milne-Edwards).

Chlorodius (Leptodius) convexus A. MILNE-EDWARDS, Rev. Mag. Zool. (2), XXI, 1869, p. 410.

West African localities.—Cape Verde Islands, at St. Vincent, St. Lucia, Mayo, and Santiago (A. Milne-Edwards); Iogo-Iogo, St. Thomas Island (Osorio); Isla das Rolas (Osorio).

Genus XANTHIAS Rathbun.

XANTHIAS MELANODACTYLUS (A. Milne-Edwards).

Xanthodes melanodactylus A. MILNE-EDWARDS, Nouv. Arch. Mus. Hist. Nat. Paris, IV, 1868, p. 60, pl. XVII, figs. 1–3.—MIERS, Ann. Mag. Nat. Hist. (5), VIII, 1881, p. 212.

Range.—Fayal, Azores, 50 to 90 fathoms (Miers); West Africa.

West African localities.—Madeira Islands (Miers); off Gomera, Canary Islands, 75 fathoms (Miers); Cape St. Vincent, Cape Verde Islands (A. Milne-Edwards, Miers); Harbor of Porto Praya, Cape Verde Islands, 10 fathoms (Studer); Goree Bay, Senegambia, 9 to 15 fathoms (Miers); Senegambia (Ortmann); St. Thomas Island, at Praia Almoxarife and Praia des Conchas (Osorio); Ascension Island (Miers); Ascension Island, 20 to 30 fathoms, March 25, 1890, U. S. Eclipse Expedition to West Africa, William Harvey Brown, Naturalist (U.S.N.M.).

Genus LOPHOPANOPEUS Rathbun.

LOPHOPANOPEUS SEXDENTATUS (Miers).

Lophozozymus (Lophoxanthus) sexdentatus MIERS, Ann. Mag. Nat. Hist. (5), VIII, 1881, p. 211, pl. XIII, fig. 2.

West African locality.—Goree Bay, Senegambia, 9 to 15 fathoms (Miers).

Genus EUPANOPEUS Rathbun.

EUPANOPEUS AFRICANUS (A. Milne-Edwards).

Panopeus africanus A. MILNE-EDWARDS, Ann. Soc. Entom. France (4), VII, 1867, p. 276.

Eupanopeus africanus RATHBUN, Bull. Lab. Nat. Hist. State Univ. Iowa, IV, 1898, p. 273.

West African localities.—Rock Spring, Monrovia (O. F. Cook; U.S.N.M.); Gabun and Angola (A. Milne-Edwards).

This may be the "*Panopeus herbstii*" recorded from Angola and Loanda,[1] and from Iogo-Iogo, St. Thomas Island, by Osorio.[2]

[1] Jor. Sci. Lisboa, XI, 1887, p. 224. [2] Idem. (2), II, 1890, p. 45.

Genus CHLORODIELLA Rathbun.

CHLORODIELLA LONGIMANA (Milne-Edwards).

Chlorodius longimanus MILNE-EDWARDS, Hist. Nat. Crust., I, 1834, p. 401.
Chlorodiella longimanus RATHBUN, Ann. Inst. Jamaica, I, 1897, p. 14.

Range.—Florida Reefs; West Indies; Curaçao; West Africa.
West African locality.—St. Thomas Island (Osorio).

Genus GLYPTOXANTHUS A. Milne-Edwards.

GLYPTOXANTHUS VERMICULATUS (Lamarck).

Cancer vermiculatus LAMARCK, Hist. Nat. Anim. sans Vert., V, 1818, p. 271.
Xantho vermiculatus MILNE-EDWARDS, Hist. Nat. Crust., I, 1834, p. 391.
Actæa angolensis CAPELLO, Desc. alg. esp. nov. Crust. e Arach. Portugal e poss. Port. do ultramar, 1866, p. 4, pl. I, fig. 3; Mem. Acad. R. Sci. Lisboa, Cl. de Sci. Nat., Nova Ser., IV, 1867, Pt. 1.
Glyptoxanthus vermiculatus A. MILNE-EDWARDS, Crust. Rég. Mex., 1879, p. 255, pl. XLIII, fig. 2.

West African locality.—Angola (Capello, Osorio).

In 1868,[1] A. Milne-Edwards said "Le *Xantho vermiculatus* des Antilles a été signalé à Angola par M. Capello." Later, in 1879,[2] he said "La patrie des deux exemplaires qui ont servi aux descriptions de Lamarck et de M. Milne-Edwards, et qui appartiennent aux collections du Muséum, est inconnue; mais il est très probable que c'est l'Amérique."

Genus PILUMNUS Leach.

KEY TO THE WEST AFRICAN SPECIES OF THE GENUS PILUMNUS.

A. Outer surface of the larger hand granulate except toward the lower margin. *verrucosipes.*
A'. Outer surface of larger hand armed with strong spines ..... *africanus.*

PILUMNUS VERRUCOSIPES Stimpson.

Pilumnus verrucosipes STIMPSON, Proc. Acad. Nat. Sci. Phila., X, 1858, p. 36.—MIERS, Ann. Mag. Nat. Hist. (5), VIII, 1881, p. 216, pl. XIII, fig. 5.

African localities.—Goree Bay, Senegambia, 9 to 15 fathoms (Miers); Simons Bay, Cape of Good Hope, 11 fathoms (Stimpson).

PILUMNUS AFRICANUS A. Milne-Edwards.

Pilumnus africanus A. MILNE-EDWARDS, Ann. Soc. Entom. France (4), VII, 1867, p. 280.

West African localities.—Goree, Senegambia (A. Milne-Edwards); Angola (A. Milne-Edwards); Loanda (Osorio).

[1] Nouv. Arch. Mus. Hist. Nat. Paris, IV, p. 149. [2] Crust. Rég. Mex., p. 255.

Genus EPIXANTHUS Heller.

EPIXANTHUS HELLERII A. Milne-Edwards.

Epixanthus hellerii A. Milne-Edwards, Ann. Soc. Entom. France (4), VII, 1867, p. 278.

Ozius corrugatus Osorio, Jor. Sci. Lisboa, XI, 1887, p. 224; (2), I, 1889, p. 131.

West African localities.—Senegal (A. Milne-Edwards); Gabun (A. Milne-Edwards); St. Thomas Island, at Iogo-Iogo, S. João dos Angulares and Praia das Conchas (Osorio); Angola (Osorio).

Family PORTUNIDÆ.

KEY TO THE WEST AFRICAN GENERA OF THE FAMILY PORTUNIDÆ.

A. Antero-lateral teeth nine.
  B. Flagellum of antenna entering orbit.
    C. Abdomen of male triangular ..... *Portunus.*
    C′. Abdomen of male an inverted T ..... *Callinectes.*
  B′. Basal joint of antenna enlarged and almost excluding the antenna from the orbit ..... *Charybdella.*
A′. Antero-lateral teeth less than nine.
  B. Carapace wide, subquadrilateral. Front and orbits occupying almost entire width of carapace ..... *Thalamita.*
  B′. Carapace narrow; frontal and antero-lateral borders forming a regular curve. Lateral teeth five.[1] ..... *Liocarcinus.*

Genus PORTUNUS Fabricius.

= *Neptunus* De Haan.

KEY TO THE WEST AFRICAN SPECIES OF THE GENUS PORTUNUS.

A. Posterior border of the arm with two spines near the wrist ..... *validus.*
A′. Posterior border of the arm with one spine at the wrist.
  B. Carapace rough with series of granulations. Hand with three spines .. *hastatus.*
  B′. Carapace almost smooth.
    C. Hand with two spines ..... *edwardsi.*
    C′. Hand with one spine ..... *pallidus.*

PORTUNUS VALIDUS Herklots.

Portunus (*Posidon*) *validus* Herklots, Addit. Faun. Africæ Occ., 1851, p. 4, pl. 1, fig. 1.

Neptunus validus A. Milne-Edwards, Arch. Mus. Hist. Nat., X, 1861, p. 321, pl. xxix, fig. 1.

West African localities.—St. George del Mina, Guinea (Herklots); Benguela (Osorio).

[1] "*Lupa spinimosa* Learn." is known to me only by the entry of Osorio in Jor. Sci. Lisboa (2), I, 1890, p. 129.

PORTUNUS HASTATUS (Linnæus).

Cancer hastatus LINNÆUS, Sys. Nat., 12th ed., I, 1767, Pt. 2, p. 1046.
Lupa hastata MILNE-EDWARDS, Hist. Nat. Crust., I, 1834, p. 455.
Neptunus (Amphitrite) inæqualis MIERS, Ann. Mag. Nat. Hist. (5), VIII, 1881, p. 217, pl. XIII, fig 6.

Range.—West coast of Spain and Portugal; Azores; Mediterranean Sea; West Africa.

West African localities.—Canaries; Goree Bay, Senegambia, 9 to 15 fathoms (Miers); St. Thomas Island, at Praia das Conchas and Baie d'Anna Chaves (Osorio).

PORTUNUS EDWARDSI (Rochebrune).

Neptunus edwardsi ROCHEBRUNE, Bull. Soc. Philom. Paris (7), VII, 1883, p. 169.

West African localities.—Gambia and Casamance Rivers (Rochebrune).

PORTUNUS PALLIDUS Rochebrune.

Neptunus pallidus ROCHEBRUNE, Bull. Soc. Philom. Paris (7), VII, 1883, p. 170.

West African locality.—Lac de N'Guer, Marigots de M'Bao, Thionk, Leybar (Rochebrune).

Genus CALLINECTES Stimpson.

KEY TO THE WEST AFRICAN SPECIES OF THE GENUS CALLINECTES.

A. Length of lateral spine less than twice that of preceding tooth ..... *bocourti.*
A′. Length of lateral spine more than twice that of preceding tooth.
B. Appendages of first abdominal segment of male much shorter than the abdomen.
C. Lateral spine long and slender, about three times length of preceding tooth. *gladiator.*
C′. Lateral spine shorter and stout, between two and two and a half times length of preceding tooth ..... *marginatus.*
B′. Appendages as long as the abdomen ..... *latimanus.*

CALLINECTES BOCOURTI A. Milne-Edwards.

Callinectes bocourti A. MILNE-EDWARDS, Crust. Rég. Mex., 1879, p. 226 (variety of *C. diacanthus*).—RATHBUN, Proc. Biol. Soc. Wash., XI, 1897, p. 151, and synonymy.
? *Neptunus amnicola* ROCHEBRUNE, Bull. Soc. Philom. Paris (7), VII, 1883, p. 168.

Range.—Honduras to Rio de Janeiro, Brazil; West Africa.

West African localities.—Senegal; Liberia; Chinchoxo. *Neptunus amnicola* Rochebrune is described from Sénégal, Falèmé, Bakoy, Bafing, "et tous les Marigots tributaires."

Osorio records "*Neptunus diacanthus*" from Angola, Benguella, Loanda, Lobito,[1] from Praia das Conchas, St. Thomas,[2] and from Iogologo, St. Thomas.[3] De Man reports *N. diacanthus* from Liberia, St. George del Mina, and Congo.[4] Thallwitz also records a *Callinectes*

[1] Jor. Sci. Lisboa, XI, 1887, p. 225.
[2] Idem. (2), I, 1889, p. 131.
[3] Idem. (2), II, 1890, p. 199.
[4] Notes Leyden Mus., V, 1883, p. 150.

("*Neptunus diacanthus*") from Ogowé, West Africa, and Bahia, Brazil.[1] It is impossible to tell without examination of specimens whether these so-called "*N. diacanthus*" are synonymous with *C. bocourti* or with other species of *Callinectes*.

Rochebrune says of *Neptunus amnicola*, which I think may be identical with *Callinectes bocourti*, that it is found only in the fresh waters of rivers and is much sought after for food, the meat being exceptionally good. The negroes fish for them to eat and to sell to the Europeans. The Ouolofs call it "koti."

CALLINECTES MARGINATUS (A. Milne-Edwards).

Neptunus marginatus A. MILNE-EDWARDS, Arch. Mus. Hist. Nat. Paris, X, 1861, p. 318, pl. XXX, fig. 2.

Callinectes marginatus RATHBUN, Proc. Biol. Soc. Washington, XI, 1897, p. 149, and synonymy.

Range.—Bahamas and Florida Keys to Bahia, Brazil; West Africa.

West African localities.—Cape Verde Islands; Bissau (Osorio); Liberia; Beyah River, Elmina, Ashantee; Gabun; St. Paul de Loanda.

CALLINECTES GLADIATOR (Benedict).

Callinectes tumidus var. *gladiator* BENEDICT, Proc. U. S. Nat. Mus., XVI, 1893, p. 537.

Callinectes tumidus gladiator RATHBUN, Proc. U. S. Nat. Mus., XVIII, 1896, p. 360.

Callinectes gladiator RATHBUN, Proc. Biol. Soc. Washington, XI, 1897, p. 150.

West African localities.—Liberia; mouth of Mesurado River, Monrovia (O. F. Cook); Dakar (O. F. Cook); Beyah River, Elmina, Ashantee; Chinchoxo; Kongo Expedition (Brit. Mus.).

CALLINECTES LATIMANUS (Rathbun).

Callinectes latimanus RATHBUN, Proc. Biol. Soc. Washington, XI, 1897, p. 151, text figs. 6–8.

? Neptunus marginatus var. *truncata* AURIVILLIUS, K. Sv. Vet.-Akad. Handl., XXIV, 1898, Pt. 4, No. 1, p. [5], pl. 1, figs. 1–4.

West African localities.—Lagos, Bight of Benin, Guinea; Kamerun (Aurivillius).

Genus CHARYBDELLA Rathbun.

CHARYBDELLA RUBRA (Lamarck).

Portunus ruber LAMARCK, Hist. Anim. sans Vert., V, 1818, p. 260.

Cronius ruber STIMPSON, Ann. Lyc. Nat. Hist. N. Y., VII, 1860, p. 225.

Goniosoma millerii A. MILNE-EDWARDS, Nouv. Arch. Mus. Hist. Nat., IV, 1869, p. 54, pl. XVIII, figs. 1–3.—MIERS, Ann. Mag. Nat. Hist. (5), VIII, 1881, p. 218.

Cronius millerii A. MILNE-EDWARDS, Crust. Rég. Mex., 1879, p. 232.

Range.—Charleston Harbor, South Carolina, to Brazil; Panama; Acapulco (Faxon in litt.); West Africa.

[1] Abh. Ber. K. Zool. Mus. Dresden, No. 3, 1891, p. 53.

West African localities.—Cape St. Vincent, Cape Verde Islands (A. Milne-Edwards); Goree Bay, Senegambia, 9 to 15 fathoms (Miers); St. Thomas (Osorio); Loanda (Osorio).

Genus LIOCARCINUS Stimpson

= *Portunus* Leach

KEY TO THE WEST AFRICAN SPECIES OF THE GENUS LIOCARCINUS.

A. Carapace and chelipeds covered with numerous transverse lines of granules bordered with hair ..... *corrugatus*

A'. Carapace and chelipeds not covered with numerous transverse lines of granules bordered with hair ..... *pusillus*

LIOCARCINUS CORRUGATUS (Pennant).

Cancer corrugatus PENNANT, Brit. Zool., IV, 1777, p. 5.

Portunus corrugatus BOSC, Hist. Nat. Crust., I, 1802, p. 217.—MIERS, Ann. Mag. Nat. Hist. (5), VIII, 1881, p. 219.

Portunus strigilis STIMPSON, Proc. Acad. Nat. Sci. Phila., X, 1858, p. 38.

Range.—Europe; West Africa; Japan (Stimpson, Miers); Australia (Miers).

West African localities.—Off Fayal, Azores, 50 to 90 fathoms (Miers); Canaries (Brullé); St. Vincent, Cape Verde Islands (Miers); Goree Bay, Senegambia, 9 to 15 fathoms (Miers).

LIOCARCINUS PUSILLUS (Leach).

Portunus pusillus LEACH, Trans. Linn. Soc. London, XI, 1815, p. 318.

Range.—Europe (in the Mediterranean to 450 meters); Azores (Barrois); West Africa, including islands.

West African localities.—Canaries (Miers); Goree Bay, Senegambia, 9 to 15 fathoms (Miers).

Genus THALAMITA Latreille.

THALAMITA INTEGRA AFRICANA Miers.

Thalamita integra var. *africana* MIERS, Ann. Mag. Nat. Hist. (5), VIII, 1881, p. 218.

West African localities.—Canary Islands; Goree Bay, Senegambia, 9 to 15 fathoms (Miers); Saudade, St. Thomas, 750 meters altitude (Osorio).

Family CANCRIDÆ.

Genus ATELECYCLUS Leach

ATELECYCLUS ROTUNDATUS (Olivi).

Cancer rotundatus OLIVI, Zool. Adriat., 1792, p. 47, pl. II, fig. 2.

Atelecyclus rotundatus MIERS, Ann. Mag. Nat. Hist. (5), VIII, 1881, p. 220.

Range.—Mediterranean; West coast of France; West Africa.

West African locality.—Goree Bay, Senegambia, 9 to 15 fathoms (Miers).

Tribe OXYRHYNCHA.

Family MAIIDÆ.

KEY TO THE WEST AFRICAN GENERA OF THE FAMILY MAIIDÆ.

A. Eyes without defined orbits.
  B. Rostrum simple ..... *Stenorynchus.*
  B'. Rostrum two-spined ..... *Macropodia.*
A'. Eyes with defined orbits.
  B. Orbits incomplete, with open fissures.
    C. Carapace triangulate; preorbital spines acute, well developed, directed outward ..... *Pisa.*
    C'. Carapace suboval; branchial regions swollen; preorbital teeth short, blunt ..... *Micropisa.*
  B'. Orbits complete ..... *Libinia.*

Genus STENORYNCHUS Lamarck.

STENORYNCHUS SAGITTARIUS (Fabricius).

Cancer sagittarius FABRICIUS (part), Ent. Sys. emend. et aucta, II, 1793, p. 442.
Leptopodia sagittaria LEACH, Zool. Misc., II, 1815, p. 16, pl. 67.
Stenorynchus sagittarius RATHBUN, Ann. Inst. Jamaica, I, 1897, p. 4.

Range.—Cape Hatteras, North Carolina, to Rio de Janeiro, Brazil; West Africa.

West African localities.—Madeira Islands; Canary Islands; Cape Verde Islands; Senegambia (Herklots); St. Thomas (Osorio).

Genus MACROPODIA Leach.

MACROPODIA ROSTRATA (Linnæus).

Cancer rostratus LINNÆUS, Fauna Suecica, 1761, p. 492.
Cancer phalangium PENNANT, Brit. Zool., IV, 1777, p. 8, pl. IX, fig. 17.
Stenorynchus phalangium MILNE-EDWARDS, Hist. Nat. Crust., I, 1834, p. 279.—BELL, Brit. Stalk-eyed Crust., 1853, p. 2, figures.
Macropodia rostratus STEBBING, Hist. Recent Crust., 1893, p. 105.

Range.—Europe; West Africa.

West African localities.—Azores Islands; Madeira Islands; Cape Verde Islands; Goree Bay, Senegambia, 9 to 15 fathoms (Miers).

MACROPODIA ROSTRATA SPINULOSA (Miers).

Stenorhynchus rostratus var. *spinulosus* MIERS, Ann. Mag. N. H. (5), VIII, 1881, p. 206.

Range.—Belfast Bay, Ireland (Miers); Vigo Bay, Spain (Miers); West Africa.

West African locality.—Goree Bay, Senegambia, 9 to 15 fathoms (Miers).

Anterior legs armed with numerous spinules on the upper and lower edges of the arms, wrists, and hands; the fingers, which are dilated and laterally compressed, are smooth, and when closed have between them, near the base, a wide hiatus.

Genus PISA Leach.

PISA CARINIMANA Miers.

Pisa carinimana MIERS, Ann. Mag. Nat. Hist. (5), IV, 1879, p. 11, pl. IV, fig. 6; Ann. Mag. Nat. Hist. (5), VIII, 1881, p. 207.

West African localities.—Canary Islands (type locality); Goree Bay, Senegambia, 9 to 15 fathoms (Miers).

Genus MICROPISA Stimpson.

KEY TO THE WEST AFRICAN SPECIES OF THE GENUS MICROPISA.

A. Four tubercles in a transverse line on the gastric region. Branchial spines pointed.
  B. Carapace considerably longer than wide ..... *violacea.*
  B'. Carapace about as long as wide ..... *bocagei.*
A'. Three tubercles in a transverse line on the gastric region. Branchial spines terminating in a button ..... *eryophora.*

MICROPISA VIOLACEA A. Milne-Edwards.

Micropisa violacea A. MILNE-EDWARDS, Nouv. Arch. Mus. Hist. Nat., IV, 1868, p. 50, pl. XVI, figs. 3-6.
Herbstia violacea MIERS, Ann. Mag. N. H. (5), VIII, 1881, p. 206.

West African localities.—Cape St. Vincent, Cape Verde Islands (A. Milne-Edwards); Goree Bay, Senegambia, 9 to 15 fathoms (Miers); St. Thomas (Osorio); Loanda (Osorio); Angola (A. Milne-Edwards).

MICROPISA BOCAGEI Osorio.

Micropisa bocagei OSORIO, Jor. Sci. Lisboa, XI, 1887, p. 223.

West African locality.—Benguela, Angola (Osorio).

MICROPISA ERYOPHORA Rochebrune.

Micropisa eryophora ROCHEBRUNE, Bull. Soc. Philom. Paris (7), VII, 1883, p. 167.
Herbstia eryophora RATHBUN, Proc. U. S. Nat. Mus., XVI, 1893, p. 93.

West African localities.—Mouth of the Gambia and of the Casamance (Rochebrune).

Genus LIBINIA Leach.

LIBINIA DUBIA Milne-Edwards.

Libinia dubia MILNE-EDWARDS, Hist. Nat. Crust., I, 1834, p. 300, pl. XIV bis, fig. 2.—STREETS, Proc. Acad. Nat. Sci. Phila., 1870, p. 104.

Range.—Massachusetts to Texas; West Africa (Streets).

I have recently come to the conclusion that certain forms usually considered varieties of *L. dubia* are distinct. These are *L. distincta* Guérin, Capello (not von Martens) and *L. rhomboidea* Streets = *L. inflata* Streets = *L. distincta* von Martens (type examined). A specimen of the former is in the United States National Museum from Charlotte Harbor, Florida (Cat. No. 15203, U.S.N.M.), and of the latter from Merida, Yucatan (Cat. No. 2169, U.S.N.M.).

Family PARTHENOPIDÆ.

KEY TO THE WEST AFRICAN GENERA OF THE FAMILY PARTHENOPIDÆ.

A. Carapace not laterally expanded so as to conceal the ambulatory legs.. *Lambrus.*
A'. Carapace more or less expanded to form a vault in which the ambulatory legs are concealed ..... *Heterocrypta.*

Genus LAMBRUS Leach.

KEY TO THE WEST AFRICAN SPECIES OF THE GENUS LAMBRUS.

A. Carapace much wider than long ..... *macrochelos.*
A'. Carapace nearly as long as wide.
B. Carapace very convex and tuberculated..... *massena.*
B'. Carapace more depressed and sparingly granulated..... *bicarinatus.*

LAMBRUS MACROCHELOS (Herbst).

Cancer macrochelos HERBST, Natur. Krabben u. Krebse, I, 1790, p. 254, pl. XIX, fig. 107.
Lambrus mediterraneus ROUX, Crust. Médit., 1828, p. (20), pl. I.
Lambrus macrocheles ORTMANN, Zool. Jahrb., Syst., VII, 1893, p. 414.

Range.—Mediterranean Sea; West Africa.
West African locality.—Liberia, 49 fathoms (Studer).

LAMBRUS MASSENA Roux.

Lambrus massena ROUX, Crust. Médit., 1828, p. (25), pl. XXIII, figs. 7–12.
Lambrus (*Parthenopoides*) *massena* MIERS, Ann. Mag. Nat. Hist. (5), VIII, 1881, p. 207.
Lambrus (*Parthenolambrus*) *massena* MIERS, *Challenger* Rept., Zool., XVII, 1886, p. 100.

Range.—Mediterranean; West Coast of France; Azores (Barrois); Azores, off Fayal, 50 to 90 fathoms (Miers); West Africa.
West African localities.—Canaries; St. Vincent, Cape Verde Islands (Miers); Goree Bay, Senegambia, 9 to 15 fathoms (Miers).

Variety GOREENSIS Miers.

Lambrus massena var. *goreensis* MIERS, Ann. Mag. Nat. Hist. (5), VIII, 1881, p. 374 = Variety *Spinifer*, idem., p. 208.

Differs from typical *massena* in having the prominent tubercles of the gastric, cardiac, and branchial regions developed into blunt spines. A similar spine exists near the distal end of the upper surface of the arm, and the upper surface of the palms is strongly granulated and tuberculated (Miers).
West African locality.—Goree Island, Senegambia (Miers).

Variety ATLANTICA Miers.

Lambrus massena var. *atlanticus* MIERS, Ann. Mag. Nat. Hist. (5), VIII, 1881, p. 208; *Challenger* Rept., Zool., XVII, 1886, p. 100.

Front much less prominent than in typical forms, more deflexed and rounded at its distal end; the regions of the carapace less convex and

less prominently granulated, with the interspaces and the sides toward the lateral margins also more or less granulated; arm generally shorter (Miers).

West African localities.—St. Vincent, Cape Verde Islands (Miers); Goree Island, Senegambia (Miers).

LAMBRUS BICARINATUS Miers.

Lambrus (*Parthenopoides*) *bicarinatus* MIERS, Ann. Mag. Nat. Hist. (5), VIII, 1881, p. 208.

Lambrus (*Parthenolambrus*) *bicarinatus* MIERS, *Challenger* Rept., Zool., XVII, 1886, p. 99.

West African localities.—Canary Islands (Miers); Goree Island, Senegambia, 9 to 15 fathoms (Miers).

Genus HETEROCRYPTA Stimpson.

HETEROCRYPTA MALTZANI Miers.

Heterocrypta maltzani MIERS, Ann. Mag. Nat. Hist. (5), VIII, 1881, p. 209, pl. XIII, fig. 1.

Heterocrypta maltzani MIERS, Ann. Mag. Nat. Hist. (5), VIII, 1881, p. 374; *Challenger* Rept., Zool., XVII, 1886, p. 103.

Range.—Bay of Toulon, 455 meters (A. Milne-Edwards); Fayal, Azores, 50 to 90 fathoms; Azores, 450 fathoms; West Africa.

West African locality.—Goree Bay, Senegambia, 9 to 15 fathoms (Miers).

Tribe OXYSTOMATA.

Family CALAPPIDÆ.

Genus CALAPPA Fabricius.

KEY TO THE WEST AFRICAN SPECIES OF THE GENUS CALAPPA.

A. Carapace with a deep hollow on either side of the gastric region. Posterior teeth of clypeiform expansion broad and shallow ..... *gallus.*

A′. Carapace without a deep hollow on either side of the gastric region. Posterior teeth of clypeiform expansion elongate, spiniform.

B. Lateral teeth of clypeiform expansion three. Carapace marked with patches of blood red.

C. Lateral and postero-lateral teeth of clypeiform expansion longer than broad. *rubroguttata.*

C′. Lateral and postero-lateral teeth of clypeiform expansion broader than long. *granulata.*

B′. Lateral teeth of clypeiform expansion four. Carapace narrower than the preceding ..... *pelii.*

CALAPPA GALLUS (Herbst).

Cancer gallus HERBST, Natur. Krabben u. Krebse, III, 1803, Pt. 3, pp. 18, 46, pl. LVIII, fig. 1.
Cancer (Calappa) gallus LATREILLE, Règne Anim. Cuvier, III, 1817, p. 24.
Calappa galloides STIMPSON, Ann. Lyc. Nat. Hist. N. Y., VII, 1859, p. 71.

Range.—Islands of the Pacific and Indian oceans; Red Sea; West Africa; Florida Keys; Jamaica; Curaçao; Bahia, Brazil.

West African localities.—Cape Verde Islands (Paris Mus.), Guinea (Copenhagen Museum), St. Thomas (Osorio), Benguela (Osorio).

CALAPPA GRANULATA (Linnæus).

Cancer granulatus LINNÆUS, Sys. Nat., 10th ed., I, 1758, p. 627; 12th ed., I, Pt. 2, 1767, p. 1043 (type).
Cancer (Calappa) granulatus CUVIER, Hist. Nat. Anim., 1798, p. 459.
Calappa granulata CAPELLO, Jor. Sci. Lisboa, III, 1870, p. 130.

Range.—Mediterranean; Portugal; Azores; West Africa; Japan, (Barrois).

West African localities.—Canaries (Brullé); Angola (Capello); Benguela (Osorio).

CALAPPA RUBROGUTTATA Herklots.

Calappa rubroguttata HERKLOTS, Addit. Fauna Afr. Occ., 1851, p. 11.
Calappa bocagei CAPELLO, Jor. Sci. Lisboa, III, 1870, p. 130, pl. II, fig. 3.

West African localities.—Near Boutry, Guinea (Herklots); Princes Island (Osorio); St. Thomas Island (Osorio); Gabun (Paris Mus.); Angola (Capello); Benguela and Bay of Mossámedes (Osorio).

CALAPPA PELII Herklots.

Calappa pelii HERKLOTS, Addit. Fauna Afr. Occ., 1851, p. 12.

West African locality.—Near Boutry, Guinea (Herklots).

Family MATUTIDÆ.

Genus HEPATUS Latreille.

HEPATUS PRINCEPS (Herbst).

Cancer princeps HERBST, Natur. Krabben u. Krebse, II, 1794, p. 154, pl. XXXVIII, fig 2.
Calappa angustata FABRICIUS, Entom. Syst., Suppl., 1798, p. 347.
Hepatus fasciatus LATREILLE, Hist. Nat. Crust., V, 1803, p. 388.

Range.—From Georgia to Brazil; West Africa; Cape of Good Hope (Herklots); East Indies (Herbst).

West African locality.—Guinea (Copenhagen Museum).

Family LEUCOSIIDÆ.

KEY TO THE WEST AFRICAN GENERA OF THE FAMILY LEUCOSIIDÆ.

A. Merus of external maxillipeds more than half the length of the ischium measured along the inner border; fingers stout, gradually narrowing from base to tip.
B. Carapace subglobular, convex, the regions usually not distinctly delimited, but merged into the general convexity ..... *Philyra.*
B′. Carapace polygonal; surface broken or nodular; regions delimited by grooves or inequalities of level ..... *Ebalia.*
A′. Merus of external maxillipeds half or less than half the length of the ischium measured along the inner border; fingers slender, almost of same diameter from base to tip ..... *Leucosia.*

Genus PHILYRA Leach.

KEY TO THE WEST AFRICAN SPECIES OF THE GENUS PHILYRA.

A. Carapace with a lateral dorsal crest ..... *cristata*
A′. Carapace without a lateral dorsal crest ..... *lævidorsalis.*

PHILYRA CRISTATA Miers.

Philyra cristata MIERS, Ann. Mag. N. H. (5), VIII, 1881, p. 263, pl. XV, fig 1.

West African locality.—Goree Bay, Senegambia, 9 to 15 fathoms (Miers).

PHILYRA LÆVIDORSALIS Miers.

Philyra lævidorsalis MIERS, Ann. Mag. N. H. (5), VIII, 1881, p. 264, pl. XV, fig. 2.

West African locality.—Goree Bay, Senegambia, 9 to 15 fathoms (Miers).

Genus EBALIA Leach.

KEY TO THE WEST AFRICAN SPECIES OF THE GENUS EBALIA.

A. Exognath of outer maxilliped reaching the distal end of the merus of the endognath ..... *affinis.*
A′. Exognath of outer maxilliped not reaching the distal end of the merus of the endognath ..... *tuberculata.*

EBALIA TUBERCULATA Miers.

Ebalia tuberculata MIERS, Ann. Mag. N. H. (5), VIII, 1881, p. 266, pl. XIV, fig. 3.

West African locality.—Goree Bay, Senegambia, 9 to 15 fathoms (Miers).

EBALIA AFFINIS Miers.

Ebalia affinis MIERS, Ann. Mag. N. H. (5), VIII, 1881, p. 268, pl. XIV, fig. 4.

West African locality.—Goree Bay, Senegambia, 9 to 15 fathoms (Miers).

Genus LEUCOSIA Fabricius.

LEUCOSIA SPINOSA (Miers).

Ilia spinosa MIERS, Ann. Mag. N. H. (5), VIII, 1881, p. 265, pl. XV, fig. 3.

West African localities.—Canary Islands; Goree Bay, Senegambia, 9 to 15 fathoms (Miers).

Family DORIPPIDÆ.

KEY TO THE WEST AFRICAN GENERA OF THE FAMILY DORIPPIDÆ.

A. The anterior extremity of the buccal cavern passes between the antennules to or even beyond the tip of the front; the afferent branchial apertures are situated in front of the bases of the chelipeds, a bridge of the carapace intervening ..... *Dorippe.*

A'. The anterior extremity of the buccal cavern either stops at, or does not reach as far as the basal joint of the antennules; the afferent branchial openings are situated immediately in front of the bases of the chelipeds ..... *Ethusa.*

Genus DORIPPE Fabricius.

DORIPPE ARMATA Miers.

Dorippe armata WHITE, Manuscript, MIERS, Ann. Mag. N. H. (5), VIII, 1881, p. 269, pl. XV, fig. 4.

West African localities.—Goree Bay, Senegambia, 9 to 15 fathoms (Miers); Island of St. Thomas (Osorio); Kongo Expedition (White's type); Benguela (Osorio).

Genus ETHUSA Roux.

ETHUSA MASCARONE (Herbst).

Cancer mascarone HERBST, Natur. Krabben u. Krebse, I, 1785, p. 191, pl. XI, fig. 69.

Ethusa mascarone ROUX, Crust. Médit., 1828 [p. 83], pl. XVIII.

Range of typical form.—Mediterranean; West Africa.

West African localities.—Canary Islands (Miers); Goree Bay, Senegambia, 9 to 15 fathoms (Miers).

Family RANINIDÆ.

Genus RANINA Lamarck.

RANINA RANINA (Linnæus).

Cancer raninus LINNÆUS, Sys. Nat., 10th ed., 1758, p. 625.
Ranina serrata LAMARCK, DESMAREST.
Ranina dentata LATREILLE, MILNE-EDWARDS.

Range.—Oriental region; West Africa (Osorio).

West African locality.—Island of St. Thomas (Osorio, 1887).

In 1889 Osorio expresses doubt as to the correctness of the label "St. Thomas."

Tribe ANOMALA.

Family DROMIDÆ.

Genus DROMIA Fabricius.

KEY TO THE WEST AFRICAN SPECIES OF THE GENUS DROMIA.

A. Front simple.
  B. Antero-lateral margin entire. ..... *fulvohispida.*
  B'. Antero-lateral margin four-toothed ..... *vulgaris.*
A'. Front two-spined ..... *spinirostris.*

DROMIA VULGARIS Milne-Edwards.

Dromia vulgaris MILNE-EDWARDS, Hist. Nat. Crust., II, 1837, p. 173, pl. XXI, figs. 5–8.

Range.—Mediterranean; Atlantic coast of Europe; West African islands.

West African islands.—Canaries (Brullé); Princes Island, and St. Thomas Island (Osorio); St. Helena (Bate).

DROMIA FULVOHISPIDA Miers.

Dromia fulvohispida MIERS, Ann. Mag. N. H. (5), VIII, 1881, p. 270, pl. XVI, fig. 1.

West African locality.—Goree Bay, Senegambia, 9 to 15 fathoms (Miers).

DROMIA SPINIROSTRIS Miers.

Dromia spinirostris MIERS, Ann. Mag. Nat. Hist. (5), VIII, 1881, p. 271, pl. XVI, fig. 2.

West African localities.—Goree Bay, Senegambia, 9 to 15 fathoms (Miers); Princes Island and St. Thomas Island (with a piece of wood on its back) (Osorio).

Suborder MACRURA.

Tribe HIPPIDÆ.

Family HIPPIDÆ.

Genus HIPPA Fabricius.

HIPPA CUBENSIS (Saussure).

Remipes cubensis SAUSSURE, Rev. Mag. Zool. (2), IX, 1857, p. 503.
Remipes scutellatus MIERS, Jour. Linn. Soc. London, XIV, 1879, p. 319. (Not *Hippa scutellata* Fabricius, 1793.)

Range.—Florida Keys to Brazil; Bermuda (Henderson); West Africa and adjacent islands.

West African localities.—Cape Verde Islands (Studer, Miers, Cunningham, Henderson); Dahomey (Osorio); St. Thomas (Osorio); Isla das Rolas (Osorio); Quinchoxo (Studer); Ascension Island (Miers, Benedict).

The generic name *Hippa* has here a different signification from that commonly indicated. *Hippa* was established by Fabricius in 1787.[1] Five species were assigned to it, one of which should still remain in the genus. Of these five species four were removed in 1798 by Fabricius himself to other genera, namely, the species *symnista*, *dorsipes*, and *scabra* to *Albunea*, and the species *variolosa* to *Symethis=Zanclifer* Henderson, 1888. The single original species, *adactyla*, left by Fabricius in the genus *Hippa*, should be regarded as the type of the genus. This species was later made the type of the genus *Remipes* by Latreille, 1806, under the name *Remipes testudinarius*. *Remipes*, therefore, becomes a synonym of *Hippa*.

Tribe PAGURIDEA.

Family CŒNOBITIDÆ.

Genus CŒNOBITA Latreille.

CŒNOBITA RUBESCENS Greeff.

Cœnobita rugosus GREEFF, SB. Ges. Beförd. Naturw. Marburg, 1882, No. 2, p. 28 (not Milne-Edwards).

Cœnobita rubescens GREEFF, SB. Ges. Beförd. Naturw. Marburg, 1884, No. 2, p. 53.—OSORIO, Jor. Sci. Lisboa, XI, 1887, p. 222.

West African islands.—St. Thomas Island (Greeff, Osorio); Rolas (Greeff, Osorio). Apparently one species only inhabits these islands, and was designated first by Greeff as *C. rugosus* Milne-Edwards, and later as a distinct species, *C. rubescens* Greeff. Osorio records it under both names.

According to Greeff, these hermits on the island of St. Thomas inhabit many different kinds of shells as well as the tests of the sea urchins, *Echinometra subangularis* and *Hipponoe esculenta*. They are numerous near the beaches, but migrate into the interior, distributing and misplacing their marine shells over the whole island, as the growth of the inhabitant or the injury to the shell requires its abandonment. In such cases they often take refuge in land shells, and returning seaward scatter these again far from the place where they have arisen and properly occur. For example, hermits were found on the beach at the mouth of a river in land shells, which naturally do not occur on the island at less than 800 meters altitude.

Osorio found some examples living in the grains of a palm, *Elais guineensis*.

Family PAGURIDÆ.

KEY TO THE WEST AFRICAN GENERA OF THE FAMILY PAGURIDÆ.

A. Pleon soft and membranaceous, imperfectly segmented.
  B. First and second abdominal segments without genital appendages.
    C. Fifth leg of male on left side without an appendage at base.
      D. No movable rostriform process.

[1] Mantissa Insectorum, pp. 329, 330.

E. Chelipeds very unequal and dissimilar.
F. Left cheliped the larger. Third maxillipeds approximate at base. *Petrochirus.*
F′. Right cheliped the larger. Third maxillipeds distant at base.. *Pagurus.*
E′. Chelipeds equal or subequal, and similar.
F. Dactyli of second and third pairs of feet not twisted ..... *Clibanarius.*
F′. Dactyli of second and third pairs of feet twisted..... *Isocheles.*
D′. A movable rostriform process between the eye stalks. Left cheliped the larger..... *Diogenes.*
C.′ Fifth leg of male on left side with an appendage at base.
D. Appendage more or less spirally twisted ..... *Spiropagurus.*
D′. Appendage short and curved..... *Anapagurus.*
B′. First and second abdominal segments provided with genital appendages. *Paguristes.*
A′. Pleon composed of seven distinct segments ..... *Glaucothoe,* a larval form.

Genus PETROCHIRUS Stimpson.

(Includes *Pagurus* Stimpson.)

KEY TO THE WEST AFRICAN SPECIES OF THE GENUS PETROCHIRUS.

A. Hands with an oval cavity on the upper surface near the inner margin.. *caritarius.*
A′. Hands without an oval cavity on the upper surface near the inner margin.
B. Upper surface of propodus of large cheliped more or less spinous.
C. Upper surface of propodus of large cheliped crossed obliquely by rough striæ.
D. Striæ spinous only toward their inner side ..... *arrosor.*
D′. Striæ spinous throughout their length ..... *arrosor pectinatus.*
C.′ Upper surface of propodus of large cheliped with spines arranged partly in longitudinal rows ..... *pustulatus.*
B′ Upper surface of propodus of large cheliped covered with small irregular plates overlapping like tiles ..... *granulimanus.*

PETROCHIRUS ARROSOR (Herbst).

Cancer arrosor HERBST, Natur. Krabben u. Krebse, II, 1796, p. 170, pl. XLIII, fig. 1.
Pagurus strigosus BOSC, Hist. Nat. Crust., II, 1802, p. 77, pl. XI, fig. 3.
Pagurus striatus LATREILLE, Hist. Nat. Crust., VI, 1803, p. 163.

The type of this species is preserved in the Berlin Museum.

Range.—Mediterranean; Portugal; West Africa, including islands; Japan (de Haan); Zebu, Philippines (Henderson); off Tablas Island, 100 to 115 fathoms (Henderson).

West African localities.—Madeira (Stimpson, Miers, Studer); Cape Verde Islands, 47 fathoms (Studer); Goree Bay, Senegambia, 9 to 15 fathoms (Miers); Dakar to 8 meters, Goree, 15 meters, and Rufisque, 6 meters (Chevreux and Bouvier).

PETROCHIRUS ARROSOR PECTINATUS Ortmann.

Pagurus striatus var. *pectinata* ORTMANN, Zool. Jahrb., Syst., VI, 1892, p. 284, pl. XII, fig. 10.

Range.—Brazil (Ortmann); Dakar, Senegal (O. F. Cook, collector).

In this form, which may prove to be a distinct species, the last two joints of the third foot of the left side have a longitudinal median sulcus on the outer surface much deeper than in any specimens of typical *P. arrosor.*

PETROCHIRUS GRANULIMANUS (Miers).

Pagurus granulimanus MIERS, Ann. Mag. Nat. Hist. (5), VIII, 1881, p. 276, pl. XVI, fig. 3.—CHEVREUX and BOUVIER, Bull. Soc. Zool. France, XVI, 1891, p. 254; Mém. Soc. Zool. France, V, 1892, p. 116, pl. III, figs. 11–15.

West African localities.—Cape Verde Islands (Milne-Edwards and Bouvier); Dakar, Goree, and Rufisque (Chevreux and Bouvier); Goree Bay, 9 to 15 fathoms (Miers); Dakar (O. F. Cook, collector); Senegambia (Ortmann).

PETROCHIRUS CAVITARIUS Osorio.

Petrochirus ? cavitarius OSORIO, Jor. Sci. Lisboa, XI, 1887, p. 228.
Petrochirus cavitarius OSORIO, Jor. Sci. Lisboa (2), I, 1889, p. 139.

West African localities.—Cape Verde Islands; Princes Island; Loanda; Angola (Osorio).

PETROCHIRUS PUSTULATUS (Milne-Edwards).

Pagurus pustulatus MILNE-EDWARDS, Ann. Sci. Nat. (3), X, 1848, p. 60.
Eupagurus ? pustulatus STIMPSON, Proc. Acad. Nat. Sci. Phila., X, 1858, p. 238.
Petrochirus pustulatus CHEVREUX and BOUVIER, Bull. Soc. Zool. France, XVI, 1891, p. 254; Mém. Soc. Zool. France, V, 1892, p. 112, pl. III, figs. 6–10.

West African localities.—Goree (Milne-Edwards); Dakar (Chevreux and Bouvier).

Genus PAGURUS Fabricius.

= *Eupagurus* Brandt.

KEY TO THE WEST AFRICAN SPECIES OF THE GENUS PAGURUS.

A. Upper surface of right cheliped with a median longitudinal ridge.
  B. Ridge prominent; depressions deep and relatively smooth ..... *excavatus.*
  B′. Ridge low; depressions shallow and granulate ..... *sculptimanus.*
A′. Upper surface of right cheliped without ridges.
  B. Hand much longer than wide ..... *inermis.*
  B′. Hand as wide as long (in the palmar portion) ..... *triangularis.*

PAGURUS EXCAVATUS (Herbst).

Cancer excavatus HERBST, Natur. Krabben u. Krebse, II, 1791, p. 31, pl. XXIII, fig. 8.
Pagurus angulatus RISSO, Crust. Nice, 1816, p. 58, pl. I, fig. 8.
Pagurus excavatus WHITE, List Crust. Brit. Mus., 1847, p. 59.
Eupagurus angulatus STIMPSON, Proc. Acad. Nat. Sci. Phila., X, 1858, p. 237.

Range.—Mediterranean; Bay of Biscay; Goree Bay, Senegal, 9 to 15 fathoms (Miers).

I have not attempted to give the complete synonymy of this species. From the series of specimens in the U. S. National Museum, I judge that *P. meticulosus* Roux is distinct from *P. excavatus* (Herbst). It is probable that this last should be called *P. alatus* Fabricius, described from Iceland, in 1775; type not extant.

PAGURUS SCULPTIMANUS (Lucas).

Eupagurus sculptimanus LUCAS, Expl. Sci. Algérie, Zool., I, Crust., 1846, p. 32, pl. III, fig. 6.—CHEVREUX and BOUVIER, Bull. Soc. Zool. France, XVI, 1891, p. 253; Mém. Soc. Zool. France, V, 1892, p. 104, pl. II, figs. 18–20.

Range.—Mediterranean; West Africa.

West African localities.—Madeira and Canaries (Milne-Edwards and Bouvier); Bay of Goree, 15 meters (Chevreux and Bouvier).

PAGURUS TRIANGULARIS (Chevreux and Bouvier).

Eupagurus triangularis CHEVREUX and BOUVIER, Bull. Soc. Zool. France, XVI, 1891, p. 253; Mém. Soc. Zool. France, V, 1892, p. 93, pl. II, figs. 9–15.

West African localities.—Cape Verde Islands (Milne-Edwards and Bouvier); Bay of Dakar, 8 meters (Chevreux and Bouvier).

PAGURUS? INERMIS (Chevreux and Bouvier).

Eupagurus? inermis CHEVREUX and BOUVIER, Mém. Soc. Zool. France, V, 1892, p. 109, pl. III, figs. 1–5.

West African locality.—Bay of Dakar, 8 meters (Chevreux and Bouvier).

Genus CLIBANARIUS Dana.

KEY TO THE WEST AFRICAN SPECIES OF THE GENUS CLIBANARIUS.

A. Dactyli of second and third pairs of feet shorter than propodi.
  B. Claws covered with short conical spines or tubercles.
    C. Ambulatory feet punctate ..... *senegalensis.*
    C′. Ambulatory feet not punctate ..... *æquabilis.*
  B′. Claws covered with flat granulated scales ..... *melitai.*
A′. Dactyli of second and third pairs of feet longer than propodi.
  B. Second and third pairs of feet diagonally banded.
    C. Propodi of second and third pairs of feet short, less than three times as long as wide ..... *africanus.*
    C′. Propodi long and slender, more than three times as long as wide ... *virescens.*
  B′. Second and third pairs of feet not banded nor striped.
    C. Movable finger of cheliped the length of the palm ..... *clibanarius*, variety
    C′. Movable finger longer than the palm (measured along inner margin) .. *cooki.*

CLIBANARIUS ÆQUABILIS Dana.

Clibanarius æquabilis DANA, Crust. U. S. Expl. Exped., I, 1852, p. 464; 1855, pl. XXIX, fig. 4.—AURIVILLIUS, K. Sv. Vet.-Akad. Handl., XXIV, 1898, p. 12, pl. IV, fig. 8.

Range.—Tahiti (Dana); West Africa and islands.

West African localities.—Madeira (Dana, Stimpson); Porto Praya, Cape Verde Islands (Dana); Princes Island (Osorio; identification doubtful); Kamerun, not far from Bibundi, in the sea (Aurivillius).

CLIBANARIUS SENEGALENSIS Chevreux and Bouvier.

Clibanarius senegalensis CHEVREUX and BOUVIER, Bull. Soc. Zool. France, XVI, 1891, p. 256; Mém. Soc. Zool. France, V, 1892, p. 131, pl. IV, figs. 7–11.

West Africa.—Dakar, Senegal (Chevreux and Bouvier).

CLIBANARIUS MELITAI Chevreux and Bouvier.

Clibanarius melitai CHEVREUX and BOUVIER, Bull. Soc. Zool. France, XVI, 1891, p. 255; Mém. Soc. Zool. France, V, 1892, p. 135, pl. IV, figs. 1–6.

West Africa.—Dakar, Senegal (Chevreux and Bouvier).

CLIBANARIUS COOKI, new species.

Allied to *C. cubensis* (Saussure) = *C. sclopetarius* Stimpson, not Herbst. Eyes long and slender; second and third pairs of feet not striped.

In most of its characters this species resembles *C. cubensis* of the eastern coast of America. The anterior part of the carapace is proportionally shorter than in that species. The eyes, though longer and slenderer than in other West African species, are shorter than in *cubensis;* they reach slightly beyond the peduncles of the antennæ and antennulæ. Peduncles of antennulæ very little longer than those of the antennæ. Last segment of peduncle of antennæ more slender than in *cubensis.*

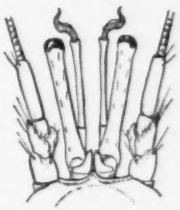

FIG. 1.—CLIBANARIUS COOKI. FRONT AND CEPHALIC APPENDAGES, DORSAL VIEW. TWICE NATURAL SIZE.

FIG. 2.—CLIBANARIUS COOKI. LEFT LEG OF SECOND PAIR, OUTER FACE. TWO-THIRDS NATURAL SIZE.

Chelipeds, as in *cubensis*, equal. The penultimate segments of the ambulatory legs are narrower than in *cubensis.* These legs are without stripes or bands of color; otherwise they resemble those of *cubensis.* The dactylus of the second leg is about as long as its propodus and one-third its carpus; that of the third leg as long as its propodus and two-thirds its carpus.

Color in alcohol.—Carapace yellowish; legs yellowish red.

Dimensions.—Male: Length of anterior portion of carapace, 13.8 mm.; width of same, 11.5 mm.; length of eyestalk, 11 mm.; length of dactylus of first ambulatory, 20.5 mm.

Type locality.—Mouth of Mesurado River, Monrovia; O. F. Cook, collector; one male (Cat. No. 22156, U.S.N.M.).

CLIBANARIUS AFRICANUS Aurivillius.

Clibanarius africanus AURIVILLIUS, K. Sv. Vet.-Akad. Handl., XXIV, 1898, p. 12, pl. IV, fig. 7.

West African locality.—Kamerun; in river at Bibundi, in shells of brackish-water snails; Kitta. (Aurivillius.)

CLIBANARIUS VIRESCENS (Krauss).

Pagurus virescens KRAUSS, Die Südafr. Crust., 1843, p. 56, pl. IV, fig. 3.
Clibanarius virescens DANA, Crust. U. S. Expl. Exped., I, 1852, p. 466.

Range.—Natal coast (Krauss); the Zaire or Kongo (Osorio); Fijis, Balabac Passage and Sooloo Sea (Dana; identification doubtful).

CLIBANARIUS CLIBANARIUS (Herbst).

Cancer clibanarius HERBST, Natur. Krabben u. Krebse, II, 1791, p. 20, pl. XXIII, fig. 1.
Clibanarius vulgaris DANA, Crust. U. S. Expl. Exped., I, 1852, p. 462.
"*Clibanarius vulgaris* (HERBST) var. ?," THALLWITZ, Abh. u. Ber. K. Zool. Mus., Dresden, 1890-91 [1891] No. 3, p. 33.

Range.—Oriental region; Africa.

African localities.—Ogove (Thallwitz); Angola or the Kongo (Osorio); South Africa (Krauss).

Genus ISOCHELES Stimpson.

ISOCHELES ? GRACILIS Miers.

Isocheles ? gracilis MIERS, Ann. Mag. N. H. (5), VIII, 1881, p. 277, pl. XVI, fig. 4.

West African locality.—Goree Bay, Senegambia, 9 to 15 fathoms (Miers).

Genus DIOGENES Dana.

KEY TO THE WEST AFRICAN SPECIES OF THE GENUS DIOGENES.

A. Carpus and palm of left cheliped oblong, much longer than wide.
B. Large hand with an oblique spinulous crest on its outer face ..... *brevirostris.*
B'. Large hand without an oblique spinulous crest on its outer face.... *pugilator.*
A'. Carpus and palm broad, the carpus subtriangular, the palm broader than long ..... *denticulatus.*

DIOGENES PUGILATOR (Roux).

Pagurus pugilator ROUX, Crust. Médit., 1828, pl. XIV, figs. 3, 4.
Diogenes varians MIERS, Ann. Mag. N. H. (5), VIII, 1881, p. 272.
Diogenes pugilator BOUVIER, Mém. Soc. Zool. France, IV, 1891, p. 396.

Range.—From England to Kotonou, on the coast of Gabun; Mediterranean; Black Sea.

West African localities.—Senegal: Goree Bay, 9 to 15 fathoms (Miers); Bay of Dakar (Chevreux and Bouvier); Rufisque (Bouvier). Monrovia and Liberia (Bouvier). Kotonou, Gabun (Chevreux and Bouvier).

Variety OVATA Miers.

Diogenes varians var. *ovata* MIERS, Ann. Mag. N. H. (5), VIII, 1881, p. 274.

West Africa.—Goree Bay, 9 to 15 fathoms (Miers); Bay of Dakar, 5 and 8 meters (Chevreux and Bouvier); Senegambia (Ortmann).

Variety GRACILIMANA Miers.

Diogenes varians var. *gracilimana* MIERS, Ann. Mag. N. H. (5), VIII, 1881, p. 274.

West Africa.—Goree Bay, 9 to 15 fathoms (Miers); Kotonou, Gabun (Milne-Edwards and Bouvier).

Variety INTERMEDIA Bouvier.

Diogenes pugilator var. *intermedia* BOUVIER, in Chevreux and Bouvier, Mém. Soc. Zool. France, V, 1892, p. 122.

West Africa.—Bay of Dakar, 8 meters (Chevreux and Bouvier); Monrovia (Milne-Edwards and Bouvier); Liberia (Bouvier); Kotonou, Gabun (Bouvier).

DIOGENES BREVIROSTRIS Stimpson.

Diogenes brevirostris STIMPSON, Proc. Acad. Nat. Sci. Phila., X, 1858, p. 245.

African localities.—Porto Praya, Cape Verde Islands (Studer); Monrovia (Studer); Simons Bay, 12 fathoms (Stimpson); Simons Bay, 10 to 20 fathoms (Henderson); Cape of Good Hope (Ortmann).

DIOGENES DENTICULATUS Chevreux and Bouvier.

Diogenes denticulatus CHEVREUX and BOUVIER, Bull. Soc. Zool. France, XVI, 1891, p. 254; Mém. Soc. Zool. France, V, 1892, p. 122, pl. III, figs. 16–20.

West African localities.—Rufisque, Senegal (Chevreux and Bouvier); mouth of Mesurado River, Monrovia (O. F. Cook, collector).

Genus SPIROPAGURUS Stimpson.

SPIROPAGURUS ELEGANS Miers.

Spiropagurus elegans MIERS, Ann. Mag. N. H. (5), VIII, 1881, p. 278, pl. XVI, fig. 5.

West African localities.—Off Gomera, Canaries, 78 fathoms (Henderson); Goree Bay, 9 to 15 fathoms (Miers); Goree, 15 meters (Chevreux and Bouvier).

Genus ANAPAGURUS Henderson.

ANAPAGURUS CURVIDACTYLUS Chevreux and Bouvier.

Anapagurus curvidactylus CHEVREUX and BOUVIER, Bull. Soc. Zool. France, XVI, 1891, p. 253; Mém. Soc. Zool. France, V, 1892, p. 91, pl. II, figs. 2–8.

West African localities.—Bay of Dakar, 8 meters; west of Goree, 15 meters (Chevreux and Bouvier).

Genus PAGURISTES Dana.

PAGURISTES HISPIDUS Milne-Edwards and Bouvier.

Paguristes hispidus MILNE-EDWARDS and BOUVIER, Ann. Sci. Nat. (7), Zool., XIII, 1892, p. 208.

West Africa.—Liberia (Milne-Edwards and Bouvier).

Genus GLAUCOTHOE Milne-Edwards.

GLAUCOTHOE CARINATA Henderson.

Glaucothoe carinata HENDERSON, *Challenger* Rept., XXVII, 1888, p. 84, pl. IX, fig. 1.—CHEVREUX and BOUVIER, Bull. Soc. Zool. France, XVI, 1891, p. 256; Mém. Soc. Zool. France, V, 1892, p. 138, pl. IV, figs. 12–24.

West African localities.—Coast of Sahara, 80 meters; Goree, 15 meters; Rufisque, 6 meters (Chevreux and Bouvier); Arguin Bank (Milne-Edwards and Bouvier).

Tribe PORCELLANIDEA.

Family PORCELLANIDÆ.

Genus PORCELLANA Lamarck.

KEY TO THE WEST AFRICAN SPECIES OF THE GENUS PORCELLANA.

A. Carapace smooth ..... *speciosa.*
A'. Carapace marked with prominent lines.
B. Front little inclined and with straight border ..... *mattosi.*
B'. Front inflected. Hands covered above with small granules disposed in groups ..... *bella.*

PORCELLANA SPECIOSA Dana.

Porcellana speciosa DANA, Crust. U. S. Expl. Exped., I, 1852, p. 417; 1855, pl. XXVI, fig. 8.

Range.—Pacific Ocean: Drummond Island, Kingsmills Group; Wakes Island; Mangsi Islands, Balabac Straits; Raraka, Paumotu Archipelago. West Africa.

West African localities.—Princes Island (Osorio); St. Thomas Island (Osorio).

PORCELLANA MATTOSI Osorio.

Porcellana mattosi OSORIO, Jor. Sci. Lisboa, XI, 1887, p. 229.

West African locality.—Loanda (Osorio).

PORCELLANA BELLA Osorio.

Porcellana bella OSORIO, Jor. Sci. Lisboa, XI, 1887, p. 229.

West African locality.—Loanda (Osorio).

Tribe THALASSINIDEA.

Family CALLIANASSIDÆ.

KEY TO THE WEST AFRICAN GENERA OF THE FAMILY CALLIANASSIDÆ.

A. Second pair of feet minutely chelate ..... *Callianassa.*
A'. Second pair of feet not chelate ..... *Upogebia.*

Genus CALLIANASSA Leach.

KEY TO THE WEST AFRICAN SPECIES OF THE GENUS CALLIANASSA.

A. Rostrum three-spined ..... *turnerana.*
A'. Rostrum five-spined ..... *diademata.*

CALLIANASSA TURNERANA White.

Callianassa turnerana WHITE, Proc. Zool. Soc. London, 1861, p. 42, pl. VI.—A. MILNE-EDWARDS, Nouv. Arch. Mus. Hist. Nat. Paris, VI, 1870, p. 89.

West Africa.—Kamerun (White, A. Milne-Edwards).

CALLIANASSA DIADEMATA Ortmann.

Callianassa diademata ORTMANN, Zool. Jahrb., Syst., VI, 1891, p. 56, pl. I, fig. 11.

Range.—Africa, probably West Africa (Ortmann).

Genus UPOGEBIA Leach.

UPOGEBIA FURCATA (Aurivillius).

Gebia furcata AURIVILLIUS, K. Sv. Vet.-Akad. Handl., XXIV, 1898, p. 13, pl. I, figs. 5–7.

West African locality.—In decaying fragments of wood, rivers of Bibundi, Kamerun (Aurivillius).

Tribe LORICATA.

Family SCYLLARIDÆ.

KEY TO THE WEST AFRICAN GENERA OF THE FAMILY SCYLLARIDÆ.

A. Exognath of external maxillipeds with a flagellum; rostrum prominent. *Scyllarides.*

A′. Exognath of external maxillipeds without a flagellum; rostrum very short, truncate..... *Scyllarus.*

Genus SCYLLARUS Fabricius.

SCYLLARUS ARCTUS PARADOXUS Miers.

Scyllarus (*Arctus*) *arctus* var. *paradoxus* MIERS, Ann. Mag. N. H. (5), VIII, 1881, p. 364.

West African localities.—Goree Bay, Senegal, 9 to 15 fathoms (Miers).

The typical form of this species is found not only in western and southern Europe, and at Madeira, the Canaries, and Azores (Mus. Comp. Zool.), but there are specimens in the U. S. National Museum from off Cape Hatteras, North Carolina, 49 fathoms (*Albatross* station 2596), from Pensacola, Florida, and from Mazatlan, Pacific coast of Mexico. It is quite distinct from *S. americanus* (Smith) = *S. gundlachi* von Martens, of the West Indian region.

Genus SCYLLARIDES Gill.

SCYLLARIDES LATUS (Latreille).

Scyllarus latus LATREILLE, Hist. Nat. Crust., VI, 1803, p. 182.

Scyllarus herklotsii PEL, in Herklots, Addit. Fauna Afr. Occ., 1851, p. 14, pl. II, figs. 14, 15.

Scyllarus dekaani HERKLOTS, Addit. Fauna Afr. Occ., 1851, p. 14, pl. II, figs. 12, 13.

Range.—Mediterranean; Portugal; Azores (U. S. N. M.); West Africa, including islands; Cuba (von Martens).

West African localities.—Canaries (Milne-Edwards); near Boutry, Guinea (Herklots); St. Helena (Bate).

Family PALINURIDÆ.

KEY TO THE WEST AFRICAN GENERA OF THE FAMILY PALINURIDÆ.

A. Upper part of antennular segment almost horizontal, broad, so that the bases of the outer antennæ are distant from each other ..... *Panulirus.*
A'. Upper part of antennular segment oblique, rather narrow, so that the bases of the outer antennæ are near together ..... *Palinostus.*

Genus PANULIRUS White.

KEY TO THE WEST AFRICAN SPECIES OF THE GENUS PANULIRUS.

A. Exognath of outer maxillipeds without palpus and reaching to the middle of the second joint ..... *regius.*
A'. Exognath of outer maxillipeds wanting ..... *ornatus.*

PANULIRUS REGIUS Capello.

Panulirus regius CAPELLO, Desc. tres esp. nov. Crust. Afr. Occ., Lisboa, 1864, p. 5, fig. 1; Mem. Acad. R. Sci. Lisboa, Cl. Sci. Nat., new ser., II, 1865, Pt. 2.
? *Senex longipes* PFEFFER, Verh. Nat. Ver. Hamb.-Altona (2), V, 1881, p. 41.

West African localities.—Cape Verde Islands (Capello); Liberia (Mus. Phila. Acad. Nat. Sci.); Monrovia and St. Thomas Island (Pfeffer); St. Thomas Island (Osorio); Benguela (Osorio).

PANULIRUS ORNATUS (Fabricius?, Herklots).

Palinurus ornatus HERKLOTS, Addit. Fauna Afr. Occ., 1851, p. 15.

West Africa.—St. George-del-Mina, Guinea (Herklots).

Genus PALINOSTUS Bate.

PALINOSTUS PHOBERUS Rochebrune.

Palinustus phoberus ROCHEBRUNE, Bull. Soc. Philom. Paris (7), VII, 1883, p. 173.

West African localities.—Mouth of the Gambia and of the Casamance (Rochebrune).

Tribe CARIDEA.

Family PENÆIDÆ.

KEY TO THE WEST AFRICAN GENERA OF THE FAMILY PENÆIDÆ.

A. First three pairs of trunk-legs with exopods ..... *Penæus.*
A'. Trunk-legs without exopods ..... *Sicyonia.*

Genus PENÆUS Fabricius.

KEY TO THE WEST AFRICAN SPECIES OF THE GENUS PENÆUS.

A. Carapace without a median groove running from the rostrum to the posterior margin ..... *velutinus.*
A'. Carapace with a median groove behind the rostrum.
B. Base of feet of third pair armed with strong spines ..... *caramote.*
B.' Base of feet of third pair without spines.
C. Telson with lateral spines ..... *canaliculatus.*
C'. Telson without lateral spines ..... *brasiliensis.*

PENÆUS CARAMOTE (Risso).

Alpheus caramote RISSO, Crust. Nice, 1816, p. 90.
Penæus caramote DESMAREST, Dict. Sci. Nat., XXVIII, 1823, p. 320.

Range.—Mediterranean, Atlantic coast of Spain and Portugal, West Africa.

West African locality.—Benguela (Osorio).

PENÆUS CANALICULATUS (Olivier).

Palæmon canaliculatus OLIVIER, Encyc. Méth., Hist. Nat., Entom., VIII, 1811, p. 660.
Penæus canaliculatus MILNE-EDWARDS, Hist. Nat. Crust., II, 1837, p. 414.

Range.—Indo-Pacific region; West Africa.

West African locality.—Benguela (Osorio).

PENÆUS BRASILIENSIS Latreille.

Penæus brasiliensis LATREILLE, Nouv. Dict. Hist. Nat., XXV, 1817, p. 156.

Range.—Hudson River at Sing Sing, New York (Stimpson), to Rio Grande do Sul, Brazil (Ortmann); West Africa.

West African localities.—Rufisque, Senegal (Miers); Elmina, Ashantee (Benedict); Whydah (Miers); St. Thomas Island (Osorio).

PENÆUS VELUTINUS Dana.

Penæus velutinus DANA, Crust. U. S. Expl. Exped., I, 1852, p. 604; 1855, pl. XL, fig. 4.

Range.—Lahaina, Sandwich Islands (Dana); Oriental region, from Japan to Gulf of Suez; West Australia; West Africa.

West African localities.—Goree Bay, Senegal, 9 to 15 fathoms (Miers); St. Thomas Island (Osorio).

Genus SICYONIA Milne-Edwards.

SICYONIA SCULPTA Milne-Edwards.

Sicyonia sculpta MILNE-EDWARDS, Ann. Sci. Nat. (1), XIX, 1830, p. 340, pl. IX, figs. 1–8.

Range.—Mediterranean; West Africa.

West African localities.—St. Vincent, Cape Verde Islands (Bate); Goree Bay, Senegal, 9 to 15 fathoms (Miers).

Family CRANGONIDÆ.

Genus PONTOPHILUS Leach.

PONTOPHILUS CATAPHRACTUS (Olivi).

Cancer cataphractus OLIVI, Zool. Adriat., 1792, p. 50, pl. III, fig. 1 (teste Ortmann).
Pontophilus cataphractus ORTMANN, Proc. Acad. Nat. Sci. Phila., 1895, p. 183.

Range.—Mediterranean; Goree Bay, Senegal, 9 to 15 fathoms (Miers).

Family ALPHEIDÆ.

Genus ALPHEUS Fabricius.

KEY TO THE WEST AFRICAN SPECIES OF THE GENUS ALPHEUS.

A. A deep fissure the length of the orbital lobes separating them from the rostrum ..... *intrinsecus.*
A′. No deep fissure between rostrum and orbital lobes.
  B. Orbital arches armed with a spine.
    C. Hands tuberculate on inner face ..... *tuberculosus.*
    C′. Hands not tuberculate on inner face ..... *macrocheles.*
  B′. Orbital arches entire.
    C. Rostrum carinated. Merus of large claw without a spine ..... *bouvieri.*
    C′. Rostrum not carinated. Merus of large claw with a spine at distal end of lower margin ..... *paracrinitus.*

ALPHEUS BOUVIERI A. Milne-Edwards.

Alpheus edwardsii DANA, Crust. U. S. Expl. Exped., I, 1852, p. 542; 1855, pl. XXXIV, fig. 2. Not *A. edwardsii* Audouin.
Alpheus bouvieri A. MILNE-EDWARDS, Bull. Soc. Philom. Paris (7), II, 1878, p. 231.

West African localities.—St. Jago, Cape Verde Islands (Dana); off St. Vincent, Cape Verde Islands (Bate, as *edwardsii*); Cape Verde Islands (A. Milne-Edwards); Bibundi, Kamerun (Aurivillius, as *edwardsi*).

ALPHEUS MACROCHELES (Hailstone).

Hippolyte macrocheles HAILSTONE, Mag. Nat. Hist., VIII, 1835, pp. 395, 549, 552, 553.
Alpheus megacheles NORMAN, Ann. Mag. Nat. Hist. (4), II, 1868, p. 175.
Alpheus pontederiæ ROCHEBRUNE, Bull. Soc. Philom. Paris (7), VII, No. 4, 1883, p. 174.

Range.—Europe; West Africa.

West African locality.—Senegambia (Rochebrune), in *Pontederia natans*, rivers of Leybar, Thiank, and Dakar-Bango, where they empty into the sea.

Coutière[1] says that Hailstone uses the specific name "*megacheles*" on the figure, "*macrocheles*" in the text.[2] Norman also[3] refers to "*Hippolyte megacheles* Hailstone."[4] In the copies of the eighth volume of the Magazine of Natural History, to which I have access, the name "*megacheles*" is not given. On page 395 the name "*macrocheles*" is used, and there is no figure on that page. "*Macrocheles*" is used again on pages 549, 552, and 553. Figure 49, on page 553, has no name beneath it, but in the list of engravings on page vii is given as "*macrocheles.*"

[1] Ann. Sci. Nat. (8), IX, 1899, p. 10.
[2] Mag. Nat. Hist., VIII, 1835, p. 395.
[3] Ann. Mag. Nat. Hist. (4), II, 1868, p. 175.
[4] Mag. Nat. Hist., VIII, p. 395.

ALPHEUS PARACRINITUS Miers.

Alpheus paracrinitus MIERS, Ann. Mag. Nat. Hist. (5), VIII, 1881, p. 365, pl. XVI, fig. 6.

Range.—Djibouti (Coutière); West Africa.

West African localities.—Goree Bay, Senegal, 9 to 15 fathoms (Miers); Praia das Conchas, St. Thomas Island (Osorio); Loanda (Osorio).

ALPHEUS TUBERCULOSUS Osorio.

Alpheus tuberculosus OSORIO, Jor. Sci. Lisboa (2), II, 1890, p. 201.

West African locality.—Iogo-Iogo, St. Thomas Island (Osorio).

ALPHEUS INTRINSECUS Bate.

Alpheus intrinsecus BATE, *Challenger* Rept., Zool., XXIV, 1888, p. 557, pl. C, fig. 1.

Range.—Off Bahia, Brazil, 7 to 20 fathoms (Bate); Iogo-Iogo, St. Thomas Island, West Africa (Osorio).

Family HIPPOLYTIDÆ.

Genus HIPPOLYTE Leach.

HIPPOLYTE species (not described).

Hippolyte species OSORIO, Jor. Sci. Lisboa (2), I, 1889, p. 137.

West African locality.—Praia das Conchas, St. Thomas Island (Osorio).

Family ATYIDÆ.

KEY TO THE WEST AFRICAN GENERA OF THE FAMILY ATYIDÆ.

A. Carpal joint of second pair of feet distally excavated ..... *Atya.*
A'. Carpal joint of second pair of feet normal, not distally excavated ..... *Caridina.*

Genus ATYA Leach.

ATYA SCABRA Leach.

Atya scabra LEACH, Trans. Linn. Soc. London, XI, 1815, p. 345.
Atya gabonensis GIEBEL, Zeitschr. f. d. gesammt. Naturwiss., Berlin (2), XII, 1875, p. 52.
Atya scabra and *gabonensis* ORTMANN, Proc. Acad. Nat. Sci. Phila., 1894, pp. 409, 410.
Atya margaritacea var. *claviger* AURIVILLIUS, K. Sv. Vet.-Akad. Handl., XXIV, 1898, p. [14], pl. III, figs. 5–8.

Range.—Mexico; Nicaragua; Costa Rica; Orinoco; West Indies; West Africa, and islands.

West African localities.—St. Paul's River, Mount Coffee (O. F. Cook, collector); Beulah and Muhlenburg Mission (O. F. Cook, collector);

Etome, Kamerun, in brooks (Aurivillius); Rio Papagaio, Princes Island (Osorio); St. Thomas Island (Greeff, Osorio); Rolas (Greeff); Gabun (Giebel); Duque de Bragança (Osorio). Known in Africa as "Sŭtŭ-feelee" or "Bitter crayfish."

Genus CARIDINA Milne-Edwards.

CARIDINA TOGOENSIS Hilgendorf.

Caridina togoensis HILGENDORF, SB. Ges. Naturf. Fr., Berlin, 1893, p. 156.

West African localities.—Bismarckburg and Adeli, Togoland (Hilgendorf).

Family PALÆMONIDÆ.

KEY TO THE WEST AFRICAN GENERA OF THE FAMILY PALÆMONIDÆ.

A. Mandibles with a palpus.
  B. Frontal margin of carapace with one tooth on each side; a second on the hepatic region nearly in the same horizontal line ..... *Bithynis.*
  B′. Frontal margin of carapace with two antennal teeth, one above the other. *Palæmon.*
A′. Mandibles without a palpus ..... *Palæmonetes.*

Genus PALÆMON Fabricius.

KEY TO THE WEST AFRICAN SPECIES OF THE GENUS PALÆMON.

A. Rostrum with seven teeth above and three below ..... *maculatus.*
A′. Rostrum with eight teeth above and four or five below.
  B. Fingers of second pair of feet much longer than palm; carpus much shorter than merus ..... *hastatus.*
  B′. Fingers of second pair of feet much shorter than palm; carpus longer than merus ..... *edwardsii.*

PALÆMON EDWARDSII Heller.

Palæmon longirostris MILNE-EDWARDS, Hist. Nat. Crust., II, 1837, p. 392; not *P. longirostris* Say, nor *P. longirostris* Milne-Edwards, Hist. Nat. Crust., II, 1837, p. 394.

Palæmon edwardsii HELLER, Crust. südl. Europa, 1863, p. 265.—CARUS, Fauna Medit., I, 1885, p. 473.

Leander edwardsii ORTMANN, Zool. Jahrb., Syst., V, 1891, p. 515.

Range.—Bay of Biscay; Mediterranean; West Africa.

West African localities.—Monrovia and Mount Coffee, Liberia (O. F. Cook and G. M. Collins, collectors). The African specimens are apparently the same species that exists in the Mediterranean and the Bay of Biscay. I have, however, no specimens for comparison.

PALÆMON HASTATUS Aurivillius.

Palæmon (*Leander*) *hastatus* AURIVILLIUS, K. Sv. Vet.-Akad. Handl., XXIV, 1898, p. 27, pl. IV, figs. 3–6.

West African locality.—Kamerun, in the sea at Beticka ba Mallale (Aurivillius).

PALÆMON MACULATUS (Thallwitz).

Leander maculatus THALLWITZ, Abh. Ber. K. Zool. Mus. Dresden, 1890–91 (1891), No. 3, p. 19.

Locality.—West Africa (Thallwitz).

Genus BITHYNIS Philippi.

KEY TO THE WEST AFRICAN SPECIES OF THE GENUS BITHYNIS.

A. Large chelipeds with palm cylindrical or nearly so.
  B. Rostrum with more than two teeth on lower margin.
    C. Carpus of large chelipeds regularly cylindrical ..... *acanthurus.*
    C′. Carpus of large chelipeds thickened in the distal portion. *jamaicensis vollenhovenii.*
  B′. Rostrum with one or two teeth on lower margin ..... *paucidens.*
A′. Large chelipeds with palm swollen and compressed, wider than the carpus.. *olfersii.*

BITHYNIS JAMAICENSIS VOLLENHOVENII (Herklots).

Palæmon vollenhovenii HERKLOTS, Tijdschr. v. Entom., Nederl. Entomol. Vereen., I, 1858, p. 96.

West African localities.—Mouth of Mesurado River, Monrovia (O. F. Cook, collector); St. Paul's River, Mount Coffee (O. F. Cook, collector); Guinea (Herklots); Lagos (Ortmann); Fluss Meme, Kamerun (Aurivillius); St. Thomas Island, in Rio Quija and Rio Gamoela, 200 meters altitude (Osorio); Kongo coast (de Man); Upper Kongo (J. H. Camp, collector); Kuanza River at Cunga (Benedict, as *jamaicensis?*); Benguela, Catumbella, Biballa, (Osorio, as *jamaicensis*).

BITHYNIS ACANTHURUS (Wiegmann).

Palæmon acanthurus WIEGMANN, Arch. f. Nat., II, Pt. 1, 1836, p. 150.
Palemon macrobrachion HERKLOTS, Addit. Faun. Afr. Occ., 1851, p. 15.
Palæmon africanus KINGSLEY, Bull. Essex Inst., XIV, 1882, p. 107.

Range.—Mouth of Rio Grande, Texas; Antilles; Escondido River, Nicaragua; Brazil; Ecuador (von Martens); West Africa.

West African localities.—Sierra Leone (von Martens); near Boutry, Guinea (Herklots); Kamerun (Aurivillius): Fluss Meme, Bibundi and Ekundu; St. Helena (Bate).

BITHYNIS PAUCIDENS (Hilgendorf).

Palæmon (*Eupalæmon?*) *paucidens* HILGENDORF, SB. Ges. Naturf. Fr. Berlin, 1893, p. 155.

West African locality.—Adeli, near Bismarckburg, Togoland (Hilgendorf).

BITHYNIS OLFERSII (Wiegmann).

Palæmon olfersii WIEGMANN, Arch. f. Nat., II, Pt. 1, 1836, p. 150.
Palæmon spinimanus MILNE-EDWARDS, Hist. Nat. Crust., II, 1837, p. 399.

Range.—Antilles; Brazil; Gulf of Dolce, Costa Rica; La Paz, Lower California; Cape St. Lucas; West Africa.

West African localities.—Etome, Kamerun, in streams (Aurivillius); Rio Papagaio, Princes Island (Osorio); St. Thomas Island (Greeff, Osorio); Rolas (Greeff).

Genus PALÆMONETES Heller.

PALÆMONETES TRISPINOSUS Aurivillius.

Palæmonetes trispinosus AURIVILLIUS, K. Sv. Vet.-Akad. Handl., XXIV, 1898, p. 29, pl. IV, figs. 1, 2.

West African locality.—Kitta, Kamerun, in a brook (Aurivillius).

DESCRIPTION OF A NEW BIRD OF THE GENUS DENDRORNIS.

By CHARLES W. RICHMOND, M. D.,
Assistant Curator, Division of Birds.

The specimen here described was sent to the U. S. National Museum several years ago by Mr. Frank B. Armstrong, who collected it at Alta Mira, Mexico. Over twenty skins of *Dendrornis flavigaster*, obtained at the same place, were also received, but none of them shows any approach to this apparently new species. It is in general similar to *D. flavigaster*, but differs in having the throat and malar patch streaked instead of uniform buff, these markings, as well as those of the remainder of the underparts, being for the most part dentate, rather than oblong; the under wing coverts are variegated, not uniform. That these characters are not those of an immature stage of *D. flavigaster* is shown by several young examples of the latter collected in Mexico by Mr. E. W. Nelson (Biological Survey collection), in which the pattern of coloration is similar to that of the adults.

The new species may be described as

DENDRORNIS STRIATIGULARIS, new species.

Type.—Cat. No. 135157, U.S.N.M.; female adult, Alta Mira, Tamaulipas, Mexico, November 18, 1894; Frank B. Armstrong, collector.

Top of head and nape dull black, each feather with a prominent elongated buff shaft spot; lores buff; sides of head dusky, streaked with buff; chin buff; rest of under parts, including under tail-coverts, hair-brown, the feathers with long (mainly dentate) buff shaft-markings, bordered with dusky black, most numerous on the throat and breast, and almost obsolete on the flanks and abdomen. Back bistre, broadly streaked with buff, the markings edged with dusky black; rump russet; upper tail-coverts burnt umber, the lateral feathers with buffy shaft-lines. Tail burnt umber; wings burnt umber, paler on the under surface, and terminal portion of inner webs of first five primaries dusky. Lesser wing-coverts russet, with narrow paler shaft-lines;

middle coverts bistre, with black-bordered buffy shaft-markings; greater coverts exteriorly bistre, becoming burnt umber over the tertiaries, with more or less concealed buffy shaft-lines, bordered on the outer webs with blackish; primary coverts bistre; edge of wing narrowly marked with buff and black; under wing-coverts (exteriorly) bistre, varied with buff and dusky black; inwardly russet.

Dimensions.—Wing, 4.15 inches; tail, 3.41 inches; tarsus, 0.90 inches; culmen, 1.50 inches.

DESCRIPTIONS OF THREE NEW BIRDS FROM LOWER SIAM.

By CHARLES W. RICHMOND, M. D.,
Assistant Curator, Division of Birds.

The birds here described as new were contained in a large collection made by Dr. W. L. Abbott in the province of Trong, Lower Siam. The collection, which was made during several trips to this locality, embraces about 1300 skins, including many not before recorded from the region, and some, like *Æthopyga temminckii*, *Geocichla horsfieldi*, and *G. interpres*, not previously known from the mainland. A very fine specimen of the rare *Thaumatibis gigantea* is also contained in the collection, which, with Dr. Abbott's customary liberality, has been sent to the U. S. National Museum.

ÆTHOPYGA ANOMALA, new species.

Type.—Cat. No. 160366, U.S.N.M.; male adult, slopes of the Khaw Song, Trong, Lower Siam, at about 2500 feet, March 2, 1897; Dr. W. L. Abbott, collector.

This species is readily distinguished from *Æ. saturata*, its nearest ally, and does not require a full description. It differs from *Æ. saturata* in smaller size, deeper red on mantle; the dark red wash on sides of breast is more pronounced; the rump lacks the yellow band characteristic of other species of the genus, and in this respect it is unique, although in *Æ. saturata* the yellow of the rump is considerably restricted. In two males of Dr. Abbott's series of fifteen skins there is a slight edging of greenish olive on the rump of the same color as the abdomen, very different, however, from the bright, clear yellow of *saturata* and other members of the genus.

In the female of *anomala* the yellow rump band is, strange to say, very prominent. Unfortunately, I have no females of *saturata* for comparison, but those of *anomala* are darker and less yellow below than the figure of the female of *saturata* in Shelley's monograph.

The adult male measures: Wing, 2 inches; tail, 2.53 inches; culmen, 0.61 inch; tarsus, 0.57 inch.

CRINIGER SORDIDUS, new species.

Type.—Cat. No. 169893, U.S.N.M.; male adult, Khow Sai Dow, Trong, Lower Siam, 2500 feet, February 14, 1899; Dr. W. L. Abbott, collector.

Upper surface of head bistre, somewhat darker on crest; lores, a narrow orbital ring, and a small spot above and posterior to eye, pale smoke gray; cheeks and ear-coverts brownish gray, the latter with lighter shaft streaks; throat pure white; breast and abdomen deep yellowish buff, washed with smoke gray on the former; under tail-coverts brownish buff, the feathers with paler tips; sides of body pale olive; sides of neck, back, scapulars, rump, and wing-coverts, olive, with a brownish wash on the latter, darkest on the primary coverts. Upper tail-coverts, tail, and wings, deep bistre, lighter on the first named; inner webs of wing-feathers blackish brown, with a narrow edging of pale wood-brown on under surface; under wing-coverts yellowish buff. "Length, 9⅛ inches."

Dimensions.—Wing, 4.30 inches; tail, 4 inches; tarsus, 0.83 inch; culmen, from base, 0.82 inch. A series of nine skins, all of which differ from *C. gutturalis* in their greater dimensions, proportionally longer crest and tail; the crest is paler; the back, rump, and sides of chest have less greenish olive; there is practically no yellow on the under parts and under wing-coverts; the tips of rectrices and borders of inner webs of same are not of a pale shade as in *C. gutturalis*. The nearest relative of *C. sordidus* is probably *C. ruficrissus* Sharpe, of Borneo, but of this form I have no specimens for comparison.

TURDINULUS GRANTI, new species.

Type.—Cat. No. 169874, U.S.N.M.; male adult, Khow Sai Dow, Trong, Lower Siam, 1000 feet, February 11, 1899; Dr. W. L. Abbott, collector.

General color above hair brown, becoming mummy-brown on the rump and upper tail coverts, the feathers of the forehead, crown, nape, mantle, and back edged with blackish brown; feathers of the mantle with whitish shaft streaks. Wings and tail chestnut, the wing-coverts like the wing, but lesser coverts with pale shaft streaks; middle and greater coverts, secondaries, and tertiaries with small, triangular, apical white spots. Sides of head and neck, including lores, a superciliary stripe extending to the nape, cheeks, and ear-coverts buffy white, each feather tipped with brownish black; a spot before eye and a line behind eye extending over the ear-coverts, brownish black. Chin, throat, and upper abdomen white, becoming ochraceous buff on the lower abdomen; breast buff, the feathers with almost obsolete dusky edges, the feathers on sides of breast with more prominent dusky brown borders. Sides of body, thighs, flanks, and under tail-coverts, mummy-brown, paler than on the rump; under wing-coverts, edge of wing, and axillars

buff, darker on the outer part of the coverts. "Iris dark brown; feet fleshy brown; bill dark horny brown above, dull leaden beneath."

Dimensions.—Wing, 2.10 inches; tail, 0.96 inch; tarsus, 0.88 inch; culmen, 0.57 inch.

Five specimens from Trong appear to be similar to the Klang example mentioned by Mr. Grant[1] and it is owing to his careful exposition of the genus that I have been able to make a satisfactory determination of the species.

This species resembles *T. exsul* (of which we have one specimen, from Mount Poeh, Borneo), but differs in being smaller, mainly buffy white below, a little deeper on the lower abdomen, with the breast buffy white, the feathers with indistinct dusky edges; the feathers of sides of breast with more prominent dusky borders, but without shaft-streaks; under wing-coverts and edge of wing are buff, brownish on the outer edge of the former. The sides of body, flanks, thighs, and under tail-coverts are lighter than in *T. exsul*.

The young bird is somewhat similar to the adult, but is more fulvous below; the black edges of feathers on head and back are hardly apparent, and the superciliary stripe and spots on wings are fulvous instead of white.

[1] Ibis, 1896, p. 60.

ON THE GENERA OF THE CHALCID-FLIES BELONGING TO THE SUBFAMILY ENCYRTINÆ.

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Among the many thousands of minute Hymenopterous insects existing in the world and to which have been given the popular name Chalcid flies, there is probably no single family that is of more interest or of greater economic importance than the family Encyrtidæ.

The species in this family, like the vast majority of other Chalcid-flies, live parasitically in the eggs, larvæ, or pupæ of other insects, and hardly a single order of Hexapodous insects is wholly free from their attacks; but in this family, and more especially in the subfamily Encyrtinæ, the species are of more than ordinary interest and importance, since so many of them are found attacking and destroying the scale- and bark-lice (Coccidæ and Aleyrodidæ) and the plant-lice (Aphididæ and Psyllidæ), containing some of the most destructive and troublesome pests with which fruit-growers, agriculturists and florists have to contend.

The subfamilies Eupelminæ, Encyrtinæ, and Signiphorinæ, the latter based upon my genus *Signiphora*, established in 1880, as I have already published elsewhere, constitute a distinct family in the subfamily Chalcidoidea, to which the family name Encyrtidæ should be applied.

The subfamily Eupelminæ was subjected to a generic revision nearly three years ago by the present author, and was published in the Proceedings of the Washington Entomological Society for 1898. He now presents a similar work on the subfamily Encyrtinæ.

The manuscript, as originally written, with the above title, was read before the Washington Entomological Society, May 13, 1897. Since that time, however, Dr. L. O. Howard[1] has characterized a number of new genera in the group, and the paper has been withheld from publication, in order to incorporate the new genera and to make certain necessary changes in nomenclature.

The family Encyrtidæ is readily distinguished from all others in the

[1] Proc. U. S. Nat. Mus., XXI, 1898, p. 231.

Chalcidoidea *by the large, non-impressed mesopleura, the large triangular mesepisternum, which does not extend to the front coxæ, and by the large saltatorial spur of the middle tibiæ, which is most frequently long and stout, or dilated at base, and usually armed with a double row of black teeth or stiff bristles.* No other family possesses this large saltatorial middle tibial spur, and only a few species, in one or two of the other families, possess the non-impressed mesopleura.

Family LXVII. ENCYRTIDÆ.[1]

The three subfamilies mentioned above, into which this family is divided, may be separated upon the following characters:

Mesonotum *not* entire, most frequently depressed or concave on disk, rarely convex, the parapsidal furrows distinct, or at least more or less present; marginal vein usually long ..... Subfamily I. EUPELMINÆ.

Mesonotum entire, convex or subconvex, the parapsidal furrows always entirely wanting.

Marginal vein rarely very long, often punctiform, and always very much shorter than the subcostal vein; stigmal vein usually short but distinct, rarely very long; scutellum normal, the axillæ never closely united to form a transverse linear sclerite at base of scutellum; middle tibiæ without lateral spurs. Subfamily II. ENCYRTINÆ.

Marginal vein long, as long or nearly as long as the subcostal vein; scutellum abnormal, the axillæ closely united without suture between, forming a transverse linear sclerite at base of scutellum proper; middle tibiæ *with* lateral spurs, the lateral apical spur lobed ..... Subfamily III. SIGNIPHORINÆ.

Subfamily II. ENCYRTINÆ.

This subfamily, as here defined, is identical with Förster's family Encyrtoidæ or Mayr's Encyrtiden, and is based upon Latreille's genus *Encyrtus*, established in 1809.

The genus was very imperfectly characterized by Latreille, who indicated as types two species, namely, *Chrysis ? infidus* Rossi (Illiger) and *Mira macrocera* Schellenberg. The latter is now manifestly not applicable, since it itself is the type of a well-characterized genus. *Chrysis infidus* Rossi, therefore, becomes the type of Latreille's genus *Encyrtus*.

Chrysis infidus Rossi was very imperfectly described and has long remained unknown, but I have identified it as the Coccid parasite known to us to-day under the name *Comys scutellata* Swederus. In the original description nothing was said of the characteristic tuft of hairs on the scutellum, and it has thus been overlooked by writers on these insects.

In 1820, Dalman, a Swede, redescribed the genus *Encyrtus* and described many new species. His diagnosis, however, was necessarily a broad one, and in reality represented the family rather than the genus,

[1] For characters of the other families see Classification of the old family Chalcididæ by W. H. Ashmead, Proc. Wash. Ent. Soc., IV, 1898-99, pp. 242-249.

and in it he included many species that are now relegated to many of our more modern genera.

From the publication of Dalman's paper down to the year 1856 several new genera were erected by Dahlbom, Nees, Westwood, Haliday, Walker, and Ratzeburg, either upon some of the Dalmanian species, or upon new discoveries.

In 1856 a great advance was made in our knowledge of the group by Dr. Arnold Förster, in his well known publication Hymenopterologische Studien, Heft II, in which he for the first time properly defined the group as a family under the name Encyrtoidæ, brings together the known genera in tabular form, and describes no less than twelve new genera.

A year later, or in 1857, Dahlbom established four new genera, namely, *Ageniaspis*, *Euscapus*, *Lonchocerus*, and *Trimorphocerus*. The second is identical with *Dinocarsis* Förster, the third with *Mira* Schellenberg, while the fourth and last seems to have been based upon a male *Bothriothorax*.

The Russian General Motschulsky, in 1863, erected his genus *Callipteroma*[1] from Ceylon; while a few years later an Italian, Camillo Rondani, described in the group three additional genera, wretchedly characterized, namely, *Tineophaga*, 1868, *Tineomyza*, 1872, and *Selitrechus*, 1877. None of them, however, belong here, but all belong to the family Eulophidæ. Tineophaga equals *Eulophus* Geoffroy; *Tineomyza* is apparently identical with *Tetrastichus* Haliday; while *Selitrechus*, as I have identified it, is a good genus in the subfamily Entedoninæ.

In 1876 the European genera and species of the Encyrtinæ were subjected to a thorough revision, by Dr. Gustav Mayr, of Vienna, Austria, in a work entitled Die Europäischen Encyrtiden, biologisch und systematisch bearbeitet.

In this most valuable contribution Dr. Mayr has shown that several of the previously described genera were synonyms, being based principally upon the opposite sex or upon apterous or subapterous forms of other genera. Dr. Mayr in his work, however, established 8 new genera, gave full descriptions of all the known genera and species, except some of Walker's, besides characterizing 25 species as new to science.

About the time of the appearance of Dr. Mayr's excellent work on the group, the well-known Swedish entomologist, Dr. C. G. Thomson, was also engaged in a systematic study of the Encyrtinæ, and the result of his labors appeared shortly afterwards.[2]

The title-page of this work antedates that of Dr. Mayr's, and I was at first inclined to give Thomson priority for certain genera which prove to be synonymous with those of Dr. Mayr's. Since my paper was read, however, Dr. L. O. Howard has most conclusively shown,

[1] Von Dalla Torre records this in his Catalogus Hymenopterorum under the family Braconidæ.

[2] Skandinaviens Hymenoptera, IV, pp. 112–183.

from a letter from Dr. Christopher Aurivillius, of the Stockholm Museum, the incorrectness of this title-page, and proves without the shadow of a doubt the priority in publication of Dr. Mayr's work.

The group was called by Thomson a tribe—Encyrtina—and he divided it into three sections, based principally upon mandibular characters, besides giving an excellent table for distinguishing the genera. Eight new genera and 26 new species were described. Three of these genera are, however, synonyms: *Liocarus* equals *Prionomastix* Mayr; *Nóbrimus* equals *Homalotylus* Mayr; while *Trechnites* equals *Metallon* Walker.

Thomson designates as the type of *Encyrtus*, *E. scutellaris* Dalman, a species evidently synonymous with *Encyrtus* (*Chrysis*) *infidus* Rossi.

The work of Thomson is unquestionably of great value, and he has drawn attention to several important structural characters not previously or subsequently noticed. In my own work I have made use of some of these characters, one of which—the shape and dentition of the mandibles—although not easily seen, I consider of tribal value.

In 1888 Christopher Aurivillius discovered and described his genus *Arrhenophagus*, a remarkable form in the group.

A year later, 1889, De Stefani, an Italian, established his genus *Hoplopsis*, a genus still unknown to me in nature, but which, judging from the description, does not belong to this subfamily, but to the subfamily Eupelminæ, "*Thorax foveolatus*" being a character found only in the Eupelminæ.

In the United States until within comparatively recent years very little original work was done in the family.

The first American who described a species in the group was Thomas Say, whose *Serlion terminalis*, described in 1828 and placed by Cresson in the genus *Scelio*, in the family Proctotrypidæ, is an encyrtine belonging to Mayr's genus *Homalotylus*.

It has been since redescribed twice: Once by Dr. Shimer as *Eutelus scymnæ*, and again by Dr. Howard as *Homalotylus obscurus*.

Since Say's time, besides myself, the only one in this country who has given special attention to these insects is Dr. L. O. Howard, whose valuable contributions toward elucidating the habits, genera, and species of this difficult group, found in America, are known to all working entomologists. He has characterized many new genera and many new species—many beautifully figured—and it is through his kindness and liberality in placing at my disposal all his material in the group that I am able to incorporate all of these genera in my tables.

I desire here also to express my thanks and obligations to the well-known hymenopterologist, Dr. Gustav Mayr, of Vienna, Austria, the leading European authority on the group, for sending me during our correspondence, extending over an interval of nearly twenty years, specimens of most of the European genera.

With these preliminary remarks I shall now proceed with the classification of the group.

CLASSIFICATION.

The subfamily Encyrtinæ, for convenience and the ready recognition of the genera, if upon no other grounds, may be divided into four tribes, as follows:

TABLE OF TRIBES.

Mandibles edentate, acute at apex 4
Mandibles bi- or tri-dentate, or broadly truncate at apex, never acute; tarsi always 5-jointed 2
2. Mandibles stout, 3-dentate at apex, although the teeth are sometimes very minute, the labrum usually conspicuous 3
Mandibles not stout, or only moderately so, rather long and always bi-dentate at apex, the labrum free; abdomen in female with the hypopygium large, lanceolate or plowshare shaped, inclosing the ovipositor and extending beyond the anus; second abdominal segment most frequently large; antennæ usually inserted just above the clypeus, rarely just below the middle of the face ..... Tribe I. ECTROMINI.
Mandibles stout, but short and polished, the apex broadly truncate, unarmed or nearly so; labrum conspicuous; abdomen with the hypopygium less evidently prominent, not projecting; body usually stout, not metallic; antennæ inserted below the middle of the face; hind tibiæ with two spurs ..... Tribe II. ENCYRTINI.
3. Hypopygium not prominent; hind tibiæ with only one spur; body most frequently, but not always, metallic; antennæ variable ..... Tribe III. MIRINI.
4. Tarsi 4- or 5-jointed; marginal vein punctiform or subobsolete ..... Tribe IV. ARRHENOPHAGINI.

Tribe I. ECTROMINI.

The species falling in this tribe are, as a rule, more elongate and narrower, the marginal vein proportionately longer, the stigmal vein shorter, while the mandibles are longer, narrower, and always bidentate at apex. This last character, together with the prominent hypopygium, in the female, may always be depended upon to distinguish a species falling in this group.

The genera may be recognized by the use of the following table:

TABLE OF GENERA.

Males 12
Females:
Face *with* a distinct carina between the bases of antennæ 8
Face *without* such a carina, rarely with a rounded ridge.
Antennæ inserted just above the clypeus or below the middle of the face.
Species wingless or subapterous 6
Species winged 2
2. Front wings with the marginal vein rather long, at least twice as long as the stigmal vein or even longer, the stigmal and postmarginal veins short; scape slender, cylindrical.
Wings fuscous, marked with white bands or rays; frons broad, the lateral ocelli nearer to the eye margin than to the front ocellus ..... (1) *Calocerinus* Howard.
Wings hyaline; frons not so broad, the lateral ocelli not nearer to the eye margin than to the front ocellus.
(2) *Tetralophidea* Ashmead, new genus.

Front wings with the marginal vein short, the postmarginal vein very short. 5

Front wings with the marginal vein long, linear, longer than the stigmal vein, the stigmal and postmarginal veins *not* short, or very rarely short, the postmarginal most frequently longer than the stigmal.

Funicle 6-jointed *without* ring-joints 3

Funicle 4-jointed with two ring-joints.

Frons minutely shagreened, with minute punctures scattered over the surface; scape slender, cylindrical, the flagellum at the most subclavate; stigmal vein very oblique, subclavate.

(3) *Meromyzobia* Ashmead, new genus.

3. Stigmal and postmarginal veins not short, usually long, the latter the longer, sometimes as long as the marginal; front wings *without* a discoidal blotch 4

Stigmal and postmarginal veins short, the latter sometimes hardly developed; front wings with a discoidal blotch.

Frons very minutely shagreened, with minute punctures scattered over the surface, or almost smooth.

Head viewed from in front longer than wide; scutellum with a tuft of long hairs; abdomen scarcely longer than the head and thorax united, the ovipositor *not* or scarcely exserted; flagellum gradually broadened toward apex, compressed, the pedicel hardly as long as the first joint of funicle; the joints after the third broader than long.

(4) *Chrysopophagus* Ashmead.

Head viewed from in front not longer than wide, if anything a little wider than long; scutellum *without* a tuft of long hairs; abdomen distinctly longer than the head and thorax united, with a prominent ovipositor which is longer than half the length of the abdomen; flagellum subclavate, not compressed, the funicle joints longer than thick.

(5) *Tineophoctonus* Ashmead, new genus.

4. Frons minutely shagreened, with minute punctures scattered over the surface; scape *not* compressedly dilated beneath, cylindrical or subcylindrical.

Antennæ not longer than the body, usually somewhat shorter, the first joint of the flagellum rarely more than twice as long as thick; stigmal vein not curved; axillæ just meet at inner basal angle ..... (6) *Ericydnus* Walker.

Antennæ longer than the body, the first joint of the flagellum about five times as long as thick; stigmal vein gently curved; axillæ unite and form a slight ridge at base of scutellum.

(7) *Leptomastix* Förster.

Frons regularly punctate; scape beneath broad, compressedly dilated, the flagellum long, filiform, cylindrical; scutellum triangular, acute at apex, the axillæ somewhat widely separated.

(8) *Dinocarsis* Förster.

Frons *not* regularly punctate, broad and smooth, margaritaceously shining, or at the most feebly shagreened; scape long, slender, the flagellum long, subcylindrical, feebly compressed, the first joint the longest, somewhat more than twice as long as thick; scutellum with two deep foveæ at base.

(9) *Ectroma* Westwood.

5. Frons finely shagreened or alutaceous, subopaque; lateral ocelli close to the eye margin; scape usually broadly compressedly dilated beneath, the flagellum *slender, cylindrical;* axillæ not quite meet-

ing at inner basal angles; front wings with a hairless line extending obliquely inward from the stigmal vein.

(10) *Anagyrus* Howard.

Frons narrow, almost smooth; lateral ocelli close to the eye margin; scape broadly dilated beneath, the flagellum *compressed, fusiform*, as seen from the side; axillæ meeting at inner basal angle.

(11) *Anusia* Förster.

6. Frons smooth, margaritaceously shining, or at the most microscopically shagreened 7

Frons regularly punctate or coriaceous or shagreened with distinct scattered punctures over the surface.

Scutellum subtriangular, rounded, not acute at apex; scape slender, cylindrical, or at most subclavate.

Flagellum filiform or subclavate, *not* compressed; axillæ touching each other at base of scutellum.

Funicle 4-jointed, with 2 minute ring-joints; ocelli normal, the lateral close to the eye margin but not touching it.

(3) *Meromyzobia* Ashmead.

Funicle 6-jointed, with no ring-joints; ocelli very minute, the lateral lying close to the eye margin ..... *Ericydnus* Walker.

Flagellum compressed; axillæ separated *not* touching each other at base of scutellum; lateral ocelli not close to eye margin; ovipositor exserted, the hypopygium very prominent lanceolate.

(12) *Henicopygus* Ashmead, new genus.

Scutellum triangular, acute at apex; scape dilated and compressed beneath.

(8) *Dinocarsis* Förster.

7. Scutellum subtriangular; head transverse.

Scutellum with two foveæ at base; scape and flagellum *not* at all compressed, cylindrical ..... (9) *Ectroma* Westwood = *Sphenolepis* Nees.

Scutellum without foveæ at base; scape broadly dilated beneath, the flagellum compressed, fusiform ..... (11) *Anusia* Förster.

Scutellum lunate; head seen from above subquadrate, wider than the thorax, the lateral ocelli rather close to the eye margin; thorax with a silvery pubescence ..... (13) *Bæocharis* Mayr.

8. Frons not broad 9

Frons broad, sublenticular, the occipital margin acute.

Front wings with the postmarginal and stigmal veins rather long, equal, not or scarcely shorter than the marginal; clypeus excised at apex; antennæ long, filiform, somewhat distant at base, the pedicel shorter than the first joint of funicle.

(14) *Stenoterys* Thomson.

Front wings with the marginal and postmarginal veins very short, the latter scarcely developed, the marginal vein nearly punctiform; clypeus normal; antennæ long, cylindrical, subclavate, the scape slender, the pedicel twice as long as the first joint of funicle ..... (15) *Tetracnemoidea* Howard.

9. Axillæ widely separated at inner basal angle; postmarginal vein not developed.

Eyes rounded; antennæ inserted far anteriorly below an imaginary line drawn from the base of the eyes . (16) *Tetracnemus* Westwood.

Axillæ united at inner basal angle, or at least touching each other.

Eyes bare 10

Eyes pubescent.

Marginal vein a little shorter than the stigmal, the postmarginal vein at least as long as the stigmal; flagellum clavate, the funicle joints short, wider than long ..... (17) *Habrolepoidea* Howard.

10. Wings fuscous, *with* white rays or bands 11
Wings hyaline.
Marginal vein about three times as long as the stigmal, the postmarginal not longer than the shaft of the stigmal, the latter short, perpendicular; axillæ just meet at inner basal angle; pronotum very short, scarcely visible from above; mesonotum scaly punctate or reticulate.
(18) *Tetralophiellus* Ashmead new genus (Type *T. brevicollis* Ashmead).
Marginal vein only a little longer than the stigmal, the postmarginal vein very short, hardly developed; axillæ meeting at inner basal angle; pronotum not short, conical; mesonotum smooth; antennæ not short, subclavate.....(19) *Tetracladia* Howard
Marginal vein fully twice as long as thick, or about half the length of the stigmal, the postmarginal only slightly developed; antennæ clavate, the club ovate, 3-jointed, much stouter than the funicle, the scape more than twice as long as thick at apex; funicle joints one-fourth longer than thick; pronotum very short, transverse linear; mesonotum microscopically reticulate; hypopygium very prominent, plowshare shaped.
(20) *Tetracnemopsis* Ashmead, new genus (Type *T. westwoodii* Cockerell).
Marginal vein punctiform, not longer than thick, the postmarginal vein *not* developed; antennæ subclavate, the pedicel hardly longer than thick at apex, but longer than the first joint of funicle; funicle joints submoniliform; pronotum very short; mesonotum shagreened or scaly punctate..(21) *Pentacnemus* Howard.
11. Marginal vein about twice as long as thick, not longer than the stigmal, the postmarginal vein hardly so long; axillæ not quite meeting at inner basal angles; antennæ subclavate, inserted close to the mouth, the scape long, slender, only slightly thickened toward apex; funicle joints 1–2 subequal, scarcely longer than thick, the following gradually increasing in thickness; eyes very large; frons narrow; mesonotum smooth, metallic, a little shorter than the scutellum, the latter opaque, shagreened; abdomen ovate, shorter than the thorax, depressed.
(22) *Habrolepopteryx* Ashmead, new genus (Type *Psilophrys pulchripennis* Ashmead).
12. Males.
Epistoma carinate 17
Epistoma not carinate.
Antennæ simple *without* branches, the scape and flagellum sometimes dilated or compressed 13
Antennæ ramose, with 4 branches.
Marginal vein rather long, the stigmal and postmarginal veins short.
Wings with fuscous rays; lateral ocelli nearer to the eye margin than to the front ocellus; axillæ meeting at base of scutellum.
(1) *Calocerinus* Howard.
Wings hyaline; lateral ocelli not nearer to the eye margin than to the front ocellus; axillæ not quite meeting at base of the scutellum.....(2) *Tetralophidea* Ashmead, new genus.
13. Wingless or subapterous forms..... 16
Winged.
Front wings with the marginal vein usually shorter, the stigmal and postmarginal veins short, or the stigmal vein is longer than the short marginal and postmarginal veins united..... 15

Front wings with the marginal vein long or somewhat long, the stigmal and postmarginal veins not short 14

Front wings with the marginal vein linear, longer than the stigmal, the postmarginal vein rather short, hardly so long as the stigmal or clearly shorter, the stigmal vein bent so as to be nearly parallel with it.

Frons and scutellum finely coriaceous, the thorax metallic or submetallic, with silvery hairs; flagellum filiform, the joints subequal, at least three times as long as thick, with long, sparse hairs ..... (4) *Chrysopophagus* Ashmead.

14. Frons minutely shagreened, with some minute punctures scattered over the surface.

Antennæ 9-pointed, with a 4-jointed funicle.

(3) *Meromyzobia* Ashmead, new genus

Antennæ 11-jointed, with a 6-jointed funicle.

Antennæ not longer than the body, the flagellum with the joints closely united and clothed with a short, dense pubescence.

(6) *Ericydnus* Walker.

Antennæ much longer than the body, the flagellum with subpedunculated joints and each joint furnished with two whorls of long hairs ..... (7) *Leptomastix* Förster.

Frons broad, smooth, margaritaceously shining, impunctate.

Antennæ long, filiform, 9-jointed, feebly compressed.

(9) *Ectroma* Westwood.

15. Marginal vein rather short and stout, the stigmal and postmarginal veins very short.

Scape usually broadly dilated below, the flagellum slender, cylindrical.

(10) *Anagyrus* Howard.

Marginal vein normal, not stout.

Stigmal vein long; scape long, dilated and compressed beneath, the flagellum filiform, clothed with a short dense pile; scutellum triangular, acute at apex; body shagreened.

(8) *Dinocarsis* Förster=*Euscapus* Dahlbom.

Stigmal vein short; scape broadly compressedly dilated beneath, the flagellum compressed, fusiform, broadest toward the middle, and gradually tapering off toward apex ..... (11) *Anusia* Förster.

16. Scutellum triangular or subtriangular, never lunate.

Scutellum triangular, acute at tip ..... (8) *Dinocarsis* Förster.

Scutellum subtriangular, rounded off at tip, *not* acute.

Frons shagreened or feebly punctate; scape and flagellum normal, the latter clothed with a short dense pile. (6) *Ericydnus* Walker.

Frons smooth, shining, somewhat iridescent.

Scutellum *with* two foveæ at base; scape and flagellum *not* at all compressed, cylindrical ..... (9) *Ectroma* Westwood.

Scutellum *without* foveæ at base; scape broadly dilated beneath, the flagellum compressed, fusiform ..... (11) *Anusia* Förster.

Scutellum lunate.

Frons convex, finely coriaceous; scape rather short, clavate, the pedicel twice as long as thick at tip, longer than the first funicle joint ..... (13) *Baeocharis* Mayr.

17. Frons broad.

Axillæ united at inner basal angles.

Antennæ long, fusiform, *without* branches inserted rather high up on the face, the flagellum clothed with sparse black pile.

(14) *Stenoterys* Thomson.

Antennæ *with* four branches, a branch on flagellar joints 1–4.

(15) *Tetracnemoidea* Howard.

Frons *not* broad.

Axillæ widely separated; antennæ with four branches.

(16) *Tetracnemus* Westwood.

Axillæ united or touching each other at their inner basal angles; antennæ simple, or ramose.

Eyes bare 18

Eyes pubescent.

Marginal vein a little shorter than the stigmal, the postmarginal at least as long as the stigmal; flagellum hairy *without* branches ..... (17) *Habrolepoidea* Howard.

18. Antennæ with *four* long branches.

Marginal vein about three times as long as the stigmal, the postmarginal very short; pronotum short, scarcely visible from above.

(18) *Tetralophiellus* Ashmead, new genus.

Marginal vein only a little longer than the stigmal, the postmarginal very short; pronotum *not* short, conical, at least the length of the mesonotum, or a little longer ..... (19) *Tetracladia* Howard.

Marginal vein only twice as long as thick, about half the length of the stigmal, the postmarginal hardly developed; pronotum very short, transverse linear.

(20) *Tetracnemopsis* Ashmead, new genus.

Antennæ with *five* long branches.

Marginal vein punctiform, not half the length of the stigmal, the postmarginal vein wanting ..... (21) *Pentacnemus* Howard.

Tribe II. ENCYRTINI.

The species belonging in this tribe are broad and robust, with broad, stout mandibles which are broadly truncate at apex and edentate or very nearly; the labrum is conspicuous; the antennæ similar in both sexes, the marginal vein in the front wings short, the stigmal and postmarginal veins usually long; in the hind wings the marginal cell is long, broad, and distinct, while the hind tibiæ have two apical spurs.

Only three genera are known, separated as follows:

TABLE OF GENERA.

Metathorax with the lateral ridge, or at least the metapleura, clothed with a silvery white pubescence; spurs of the hind tibiæ unequal, the outer one being very small 2

Metathorax with the lateral ridge bare; spurs of the hind tibiæ nearly equal. Frons broad, with sparse, thimble-like punctures, thicker toward the scrobes; front wings with the stigmal and postmarginal veins long, nearly equal in length and three or more times longer than the marginal; apical half or more of the wings usually infumated.

Scutellum *with* a bunch of hairs at apex above; first joint of flagellum scarcely so long as the second.

(23) *Encyrtus* Latreille = *Comys* Förster = *Eucomys* Förster.

(Type *Chrysis infidus* Rossi = *Comys scutellata* Swederus.)

Scutellum *without* a bunch of hairs at apex above; first joint of flagellum a little longer than the second.

(24) *Howardiella* Dalla Torre = *Howardia* Dalla Torre.

2. Frons not broad, almost smooth, opaque, or minutely shagreened, at the most with a few minute punctures scattered over the surface; front wings with the stigmal and postmarginal veins unequal, the latter only partially developed, the marginal vein very short, hardly developed; front wings hyaline, but with a discoidal cloud.

(25) *Prionomastix* Mayr = *Liocarus* Thomson.
(Type *Encyrtus morio* Dalman.)

Tribe III. MIRINI.

To this tribe belong the vast majority of the known Encyrtinæ. It is distinguished from the other tribes principally by the mandibles, which are somewhat differently shaped, and *always tridentate at apex*. In most of the genera these have three small equal, or very nearly equal, teeth, while in others the outer tooth is the longest and most acute. One or two genera, however, have the two outer teeth longer than the inner. The marginal cell in the hind wings is usually long and narrow, nearly obsolete, but never very broad, as in the Encyrtini; while the hind tibiæ have only *one* apical spur.

It may be well here to call attention to two tribes founded provisionally, in 1892 and 1895, by Dr. L. O. Howard, since all of one and part of the other belong here, namely, the Tetracnemini,[1] and the Bothriothoracini,[2] which Dr. von Dalla Torre, in the fifth volume of his Catalogus, has elevated to subfamily rank.

The first is an unnatural assemblage of genera, as Dr. Howard has already pointed out, based upon the fact that certain genera have been discovered having ramose antennæ in the males, which in itself, although interesting, is of no tribal significance, since there is scarcely a family in the Order Hymenoptera, from the most specialized to the more generalized, that does not possess one or more genera with this characteristic feature.

The second, or the tribe Bothriothoracini, too, seems to have scarcely any more reason for its existence, being based principally upon the thimble-like punctuation possessed by certain genera, all the other characters mentioned by Dr. Howard, in his diagnosis of the tribe, being common to many other genera. The thimble-like punctuation of certain genera, as well as other styles of punctuation, is a valuable diagnostic character, but of no other value, since I find all intermediate grades, from the strong, thimble-like punctuation possessed by *Bothriothorax*, of varying shades and degrees, down to a perfectly smooth impunctate surface. I consider, therefore, that both tribes are unnatural and not tenable.

The genera of this tribe are exceedingly numerous, about 59 having been recognized. It is believed, however, that all can be easily distinguished by the use of the following table.

[1] Proc. U. S. Nat. Mus., XV, 1892, p. 361. [2] Idem., XVII, 1895, p. 605.

TABLE OF GENERA.

Males 30

Females.

Mandibles shorter, with less acute, equal or nearly equal teeth; labrum not conspicuous; frons frequently, but not always, with a series of large, thimble-like punctures; wings frequently ornate or dusky, although often hyaline; scrobes usually semicircular 5

Mandibles rather long, with acute teeth, the apical tooth usually the longest and more acute than the two inner (rarely with the two outer longer than the inner); labrum conspicuous; frons very closely punctate or finely coriaceous, the thimble-like punctures absent, or the punctures smaller and sparsely scattered over the surface; wings not ornate, and usually with a very short or punctiform marginal vein, the hind wings usually with a long costal cell extending to the hooklets; abdomen usually more or less compressed toward apex, the ventral valve extending as far as the anus but not plowshare shaped; head as viewed from in front usually somewhat long, often much longer than wide, or subtriangular, the scrobes forming a triangle.

Marginal vein distinct, at least twice as long as thick, but usually longer, the postmarginal vein longer than the stigmal 4

Marginal vein punctiform, *not* or scarcely longer than thick (very rarely twice as long as thick), the postmarginal vein not at all or only slightly developed, rarely as long as the stigmal; the stigmal vein comparatively long, always more than twice as long as the marginal, or much longer; body metallic or lustrous 2

2. Head, viewed from in front, not longer than wide, the cheeks, or malar space, not especially long 3

Head, viewed from in front, long, subtriangular, much longer than wide, the cheeks or malar space long.

Front wings *not* ciliate; antennæ very long and slender, the flagellar joints all very long and cylindrical, the sixth being at least four times as long as thick, the preceding still longer.

(26) *Psilophrys* Mayr.

Front wings ciliate.

Pedicel fully three times or more longer than thick at apex.

Antennæ like *Psilophrys*, very long and slender, the scape very long, slender; cheeks not quite the length of the eyes; ovipositor very long ..... (27) *Parapsilophrys* Howard.

Flagellum long and slender, fully or about twice as long as the scape, the funicle joints all long and cylindrical, the club not or hardly thicker than the last joint of the funicle.

(28) *Liothorax* Mayr.

Flagellum scarcely one and a half times as long as the scape, the funicle joints gradually decreasing in length, but all *not* or very little longer than thick, usually transverse; head and mesonotum finely closely punctate or shagreened; frons not especially broad, club much thickened, obliquely truncate from beneath; eyes bare.

(29) *Litomastix* Thomson.

Flagellum *not* long, not much longer than the scape, the funicle joints, except the first, *not* longer than thick, the club

distinctly thickened, broader than the funicle; frons broad; eyes faintly hairy. .....(30) *Berecyntus* Howard.

Pedicel *not* three times as long as thick; cheeks the length of eyes or nearly; antennæ rather long, the funicle joints rarely more than twice as long as thick, gradually thickening apically, the sixth joint, however, never much longer than wide, sometimes wider than long.

(31) *Copidosoma* Ratzeburg.

3. Cheeks more than half the length of the eyes; pedicel scarcely twice as long as thick, the flagellum not long, the joints of the funicle all small except the first, not longer than wide, submoniliæ form, gradually increasing in size.

(32) *Prionomitus* Mayr.

Cheeks very short, almost obsolete; pedicel three times as long as thick, the flagellum very short, clavate, the joints of the funicle annular, wider than long, the club greatly enlarged, longer than the funicle; mesonotum short, twice as wide as long, the pronotum not visible from above; frons very narrow, the lateral ocelli close to eye margin, the eyes large, rounded, pubescent. .....(33) *Archinus* Howard.

4. Mesonotum smooth, impunctate, blue or metallic; pedicel about thrice as long as thick, the flagellum long, the joints of funicle much longer than thick, the club somewhat stouter than the funicle; eyes pubescent; scutellum, but not the axillæ, shagreened..... (34) *Parencyrtus* Ashmead, new genus.

Mesonotum feebly sparsely punctate, metallic blue-green; pedicel *not* twice as long as thick, the flagellum long and slender, joints 4–5 twice longer than thick, cylindrical, the club 3-jointed, not thicker than the funicle; eyes large, glabrous; scutellum as well as the axillæ sculptured.

(53) *Cerchysius* Westwood (part).

5. Abdomen with the dorsum flat or concave, *not* rigidly pubescent..... 6

Abdomen globose or subovate, much shorter than the thorax, compressed, clothed with a rigid white pubescence, the second segment usually large, smooth medially; species sometimes apterous.

Pronotum large, conical, longer than the mesonotum; antennæ with the scape and flagellum strongly compressed, broad, leaf-like; abdomen globose.

(35) *Mira* Schellenberg=*Encyrtus* Latreille (part)=*Louchocerus* Dahlbom=*Euryscapus* Förster=*Dicellocerus* Mengel.

Pronotum not large; antennæ simple, the flagellum usually long, subclavate, *not* broad, compressed.

Head above rounded, seen from in front much longer than wide; frons narrow; scape long and slender; scutellum not longer than the mesonotum, coriaceous; abdomen ovate, as long as the thorax .....(36) *Spharopisthus* Thomson.

Head, seen from in front, *not* longer than wide; frons broad, antennæ not long, inserted on a line with the base of the eyes, the flagellum subclavate, the funicle joints, or at least 3–6, wider than long; scutellum large, longer than the mesonotum; front wings in female with a substigmal cloud; postmarginal and stigmal veins long, the latter nearly parallel with costal margin; abdomen shorter than the thorax, compressed.

(37) *Chestomorpha* Ashmead, new genus.

6. Head *not* or less distinctly lenticular, smooth, shagreened or finely closely punctate, rarely with a few large punctures scattered over the surface; if with large, coarse, thimble-like punctures, the antennæ are inserted on the middle of the face.

Head always distinctly lenticular, the scrobes short, the punctures frequently large, thimble-like; hind wings with the costal cell usually extending to the hooklets.

Marginal vein at least twice as long as thick, usually much longer; mesonotum smooth, impunctate, or finely rugulose..... 10

Marginal very short, or wanting, punctiform, *not* or scarcely longer than thick; mesonotum punctate.

Mesonotum with the punctuation unlike that of the head, the punctures less dense and the surface coriaceous 8

Mesonotum with the punctuation similar to that of the head..... 7

7. Scape strongly dilated beneath or with a leaf-like expansion, the club much enlarged, as long or longer than the funicle.

(38) *Ænasius* Walker.

Scape not dilated, normal, never with a leaf-like expansion, at most clavate.

Punctures on head and thorax coarse and dense.

Mesonotum very short, only half the length of the scutellum; club of antennæ as long as all the funicle joints united; postmarginal vein as long as the stigmal..(39) *Chalcaspis* Howard.

Mesonotum at least as long as the scutellum; club of antennæ shorter than the funicle; postmarginal vein much shorter than the stigmal .....(40) *Bothriothorax* Ratzeburg.

Punctures on head and thorax smaller and less dense; mesonotum a little longer than the scutellum; funicle joints longer than thick.....(41) *Aratus* Howard.

8. Vertex very narrow or not very broad, sparsely or very feebly punctate, never closely punctate 9

Vertex broad, with a distinct thimble-like punctuation.

Club of antennæ shorter than the funicle; postmarginal and stigmal veins short, subequal .....(42) *Pentelicus* Howard.

Club of antennæ very large, longer than the funicle and pedicel united; postmarginal and stigmal veins very long, the latter the shorter.....(43) *Blepyrus* Howard.

9. Vertex not very narrow, very sparsely and feebly punctate; eyes not especially large, nor nearly occupying the whole sides of the head; scropes rather deep; scape slightly dilated beneath toward apex, the flagellum subclavate ringed with white, the club scarcely thicker than the funicle; ocelli in an obtuse triangle, the lateral farther apart than to middle or front ocellus; wings hyaline, subfuliginous toward base, the marginal vein punctiform, the stigmal longer than the short postmarginal and marginal united.

(44) *Hemanasius* Ashmead, new genus.

Vertex and face very narrow, feebly punctate; eyes very large, occupying nearly the whole sides of the head and almost meeting on vertex; front ocellus placed far in advance of the lateral ocelli, the latter close upon the eye margin; flagellum short, clavate, the pedicel large, obconic; first joint of funicle as well as the following transverse; wings with a large discal cloud beneath stigmal and marginal veins, the postmarginal and stigmal veins very long .....(45) *Euryrhopalus* Howard.

10. Marginal vein rather long, rarely shorter than the stigmal 11
Marginal vein short, rarely much more than twice longer than thick.
Head with some sparse thimble-like or umbilicate punctures; scutellum a little longer than the mesonotum; eyes pubescent.
Club of antennæ not longer than joints 1 and 2 of funicle united, the funicle joints all longer than wide; marginal vein scarcely so long as the stigmal, the postmarginal longer than the stigmal; abdomen conic-ovate, a little longer than the head and thorax united, with the ovipositor subexserted, dorsum subconcave; mandibles with the two outer teeth longer and more acute than the inner.
(46) *Hemencyrtus* Ashmead, new genus.
Club of antennæ very large and distinctly longer than the funicle, the funicle joints all very short, wider than long; abdomen depressed, oval, shorter than the thorax; mandibles with small, subequal teeth.
(47) *Coccophoctonus* Ashmead, new genus.
11. Wings embrowned, the costal cell in hind wings narrow and short; mesonotum scarcely as long as the scutellum, finely shagreened, with sparse punctures; eyes large, bare; flagellum ringed with white; pedicel obconical, only a little longer than thick, the following joints gradually shortening, the last three funiclar joints being not longer than wide.
(48) *Phanodiscus* Förster.
Wings hyaline, the costal cell in hind wings long and narrow; mesonotum much shorter than the scutellum, finely transversely rugulose or shagreened, especially anteriorly; eyes pubescent; flagellum subclavate, *not* ringed with white; pedicel very long, three times as long as thick, the funiclar joints, except the first, wider than long.
(49) *Rhytidothorax* Ashmead, new genus.
12. Antennæ inserted near the mouth border or very far below the middle of the face 13
Antennæ inserted on or a little above the middle of the face.
Frons convex, somewhat coarsely and closely punctured; scape not extending beyond ocelli; mesothorax rather coarsely shagreened; front wings with the marginal, stigmal, and postmarginal veins long, subequal.....(50) *Tanaoneura* Howard.
Frons highly convex but smooth; scape very long, extending far beyond the ocelli; mesonotum smooth, polished; front wings fasciate or maculate, the marginal vein short, the postmarginal and stigmal veins much longer.
(51) *Hexacladia* Ashmead.
13. Antennæ with the funicle 3, 4, or 5 jointed 29
Antennæ with the funicle 6-jointed.
Metathorax bare or with the lateral ridges superiorly alone pilose 16
Metathorax with the pleura and the lateral ridges always clothed with a dense silvery-white pubescence; body rather robust.
Antennæ in sexes dissimilar, the club *not* thicker than the funicle ... 14
Antennæ in sexes similar, the club strongly obliquely acuminate, conical, often white; front wings most frequently with a fuscous cloud or macula; scape cylindrical, not at all dilated.
Marginal vein *not* punctiform, the stigmal and postmarginal veins rather long, at least twice longer than the marginal.
(52) *Homalotylus* Mayr.

Marginal vein punctiform, the stigmal vein long, curved, the postmarginal vein entirely wanting or punctiform.

(53) *Isodromus* Howard.

14. Marginal and postmarginal veins not very short, the former usually but not always a little longer than the stigmal.

Thorax *without* a white lunula before the tegulæ; ovipositor *not* exserted, or if exserted very slender, the sheaths never broad..... 15

Thorax *with* a white lunula before the tegulæ, rarely without; ovipositor strongly exserted, thick and compressed, the sheaths broad; abdomen rather long, as seen from above conic-ovate..... (54) *Cerchysius* Westwood.

15. Frons rather narrow, the eyes large, converging above, the lateral ocelli lying close to the eye margin; abdomen oval or ovate, the ovipositor not exserted; thorax not closely or deeply punctate; hind wings with the costal cell short and narrow.

(55) *Sceptrophorus* Förster.

Frons not narrow, the eyes smaller and only slightly converging above, the lateral ocelli not close to eye border, distant; scrobes semicircular; abdomen oval, rotund, the ovipositor exserted but very slender; thorax short, closely punctured or with large, deep punctures; hind wings with the costal cell broad and extending to the hooklets.

(56) *Echthroplexis* Förster.

16. Head with the frons prominent, the face inflexed; antennæ frequently strongly compressed, dilated; front wings usually fuscous or with fuscous rays, the marginal vein somewhat thick, oblong, very rarely much shorter or much longer than the stigmal, the postmarginal usually wanting; ovipositor not or scarcely exserted..... 23

Head as viewed from the side, with the frons not prominent; antennæ normal or at the most with the scape compressed; wings hyaline, rarely fuscous or subfuscous, with whitish transverse or hyaline bands, the marginal vein rarely punctiform, but rarely longer than the stigmal vein, the postmarginal vein most frequently developed, rarely wanting or shorter than the marginal or stigmal veins.

Marginal vein *not* short, punctiform but rarely longer than the stigmal, the postmarginal vein most frequently well developed, rarely somewhat shorter than the marginal or stigmal veins . 17

Marginal vein very short, punctiform, rarely longer than thick, the stigmal vein from 2¼ to 3 times longer than the marginal, the postmarginal vein wanting, or short, only slightly developed, rarely well developed; scape slender or at most subclavate; body metallic.

Pedicel obconical, much stouter and longer than the first joint of funicle; sometimes as long as 1–2 united; frons rather narrow, the eyes as seen from in front somewhat convergent above; club of antennæ not especially large, shorter than the funicle.

Lateral ocelli close to or touching the eye margin; postmarginal vein not or only slightly developed.

Eyes bare; postmarginal vein *not* developed.

(57) *Ooencyrtus* Ashmead, new genus.

Eyes pubescent; postmarginal vein as long as marginal.

(60) *Ageniaspis* Dahlbom (part).

Lateral ocelli not close to the eye margin, from one and a half to twice their width from it; postmarginal vein somewhat developed.....(58) *Psyllæphagus* Ashmead, new genus.

Pedicel short, scarcely longer than thick; frons moderate, the ocelli about their width from eye margin; club of antennæ large, the length of funicle or nearly; funicle joints short, submoniliform, the three or four terminal joints wider than long.

(59) *Coccidencyrtus* Ashmead, new genus.

17. Species metallic or submetallic 18

Species not metallic; head and thorax opaque or subopaque, alutaceous, or closely microscopically punctate or shagreened and pubescent.

Postmarginal vein present.

First joint of the funicle shorter than the pedicel, all the funicle joints being short; marginal vein punctiform.(60) *Aphycus* Mayr.

First joint of the funicle much longer than the pedicel, cylindrical, the following gradually shortening but the last is still a little longer than thick .....(61) *Heterarthrellus* Howard.

Postmarginal vein wanting; joints of funicle increasing in width but not longer than wide.....(62) *Astymachus* Howard.

18. Thorax *without* a scaly pubescence and *without* white lunulæ before the tegulæ 19

Thorax *with* a scaly pubescence and *with* white lunulæ before the tegulæ.

Scape more or less dilated beneath, especially toward apex, rarely simple, the flagellum ringed with white; wings hyaline, the stigmal and postmarginal veins subequal, longer than the marginal ..... (63) *Blastothrix* Mayr.

19. Scape normal, not expanded or dilated beneath, at most subclavate; wings hyaline..... 20

Scape dilated or expanded beneath, the club not especially enlarged, shorter than the funicle, the latter usually ringed with white, the first four joints of same longer than wide; front wings usually with fuscous bands or fuscous with hyaline bands or markings .....(64) *Microterys* Thomson.

20. Thorax smooth, impunctate, or at the most microscopically reticulate, or with fine longitudinal striæ on the mesonotum..... 21

Thorax finely coriaceous, subopaque, *without* punctures scattered over the surface; frons punctured; postmarginal vein longer than the stigmal.

Scape subclavate, the funicle 6-jointed, the joints wider than long, the club not thicker than the funicle; front wings hyaline with an oblique hairless line from the marginal vein; stigmal and postmarginal veins longer than the marginal; scutellum with a delicate median grooved line at base; stigmal vein as long as the marginal and postmarginal veins united.

(65) *Holcencyrtus* Ashmead, new genus.

21. Mesonotum with fine longitudinal striæ.

Stigmal vein scarcely longer than the marginal, the postmarginal longer than the marginal and stigmal veins united; eyes pubescent; funicle joints 2–4 not longer than wide.

(66) *Ageniaspis* Dahlbom.

Mesonotum smooth, impunctate, or at the most microscopically reticulate.

Stigmal vein very short, *not* or scarcely so long as the marginal and the postmarginal veins united; axillæ meet at their inner basal angles or are separated..... 22

Stigmal vein much longer than the marginal, as long or longer than the marginal and postmarginal veins united; axillæ do not meet at their inner basal angle; club of antennæ *not* much enlarged, only about half as long as the funicle, the joints of the funicle cylindrical, much longer than wide, never moniliform; abdomen conic-ovate, usually a little longer than the head and thorax united.

(67) *Pseudencyrtus* Ashmead, new genus.

22. Stigmal vein not longer than the marginal and postmarginal veins united, usually distinctly shorter, the postmarginal vein very short or shorter than the stigmal.

Club of antennæ much enlarged, usually as long, longer, or nearly as long as the funicle, and obliquely truncate from beneath, the joints of the funicle, or at least the first three or four joints, moniliform, or not longer than thick, the others transverse, broader than long; abdomen ovate, rarely longer than the head and thorax united, most frequently the length of the thorax or a little longer.

(68) *Epiencyrtus* Ashmead, new genus.

Club of antennæ not much enlarged, nor obliquely truncate from beneath, fusiform, and less than half the length of the funicle, none of the funicle joints wider than long; abdomen short ovate, hardly as long as the thorax.

(69) *Syrphophagus* Ashmead, new genus.

Stigmal vein very short, scarcely so long as the marginal and postmarginal veins united, the former being not more than or hardly twice as long as thick, the postmarginal never well developed, although acuminate and longer than the short marginal; club of antennæ oblong, stouter, and a little more than half the length of the funicle, the first two or three joints of the funicle short or moniliform, the following usually a little longer than thick, or, at most, with only the last two joints a little wider than long; abdomen broadly oval and considerably shorter than the thorax; scutellum variable, subopaquely sculptured or polished, impunctate, the axillæ not quite meeting at their inner basal angles.....(70) *Aphidencyrtus* Ashmead, new genus.

23. Winged species 24

Wingless.

Scutellum triangular, acute at apex, not declivous, antennæ simple, the scrobes deep.....(71) *Chorcia* Westwood.

24. Head with the face much inflexed, the scrobes deep, semicircular, the frons most frequently regularly punctate..... 25

Head always semiglobose, the face less distinctly inflexed, the scrobes, however, always forming a semicircle; antennæ simple or at least never much compressed nor very broad, subcylindrical; wings not fusco-radiate; scutellum with a clump of hairs at apex .....(72) *Cheiloneurus* Westwood.

25. Wings fuscous, usually with the extreme tips white or hyaline..... 27

Wings with fuscous rays 26

Wings hyaline, or at most with a discal cloud; antennæ short.

Eyes large, rounded, strongly converging above, and leaving a very narrow or linear vertex; antennæ very short, the club enormously enlarged, longer than the funicle and several times thicker, the joints of the funicle transverse.

(73) *Zaomma* Ashmead, new genus.

Eyes not unusually large, only slightly converging above, the vertex not especially narrow; club of antennæ not unusually enlarged and about the length of the funicle, the joints of the funicle transverse, the first two or three submoniliform.

(74) *Adelencyrtus* Ashmead, new genus.

Wings with leopard-like spots; antennæ very long and slender, longer than the body, the club not enlarged.

(75) *Callipteroma* Motschulsky.

26. Head oblong; antennæ strongly compressed, broad; occipital margin and scutellum normal.....(76) *Cerapterocerus* Westwood.

Head *not* oblong; antennæ neither strongly compressed nor broad; occipital margin medially and superiorly with two strong clavate hairs; scutellum at apex with one or two clumps of stiff, broad bristles or clavate hairs; marginal vein more than twice as long as thick.

Funicle 6-jointed, the joints wider than long, the club not especially large.

(77) *Habrolepis* Förster.

Funicle 4-jointed, the joints fully twice as long as thick, or a little longer, the club very large, fusiform, nearly as long as the funicle and much stouter .....(78) *Homalopoda* Howard.[1]

27. Marginal vein shorter than the stigmal or no longer..... 28

Marginal vein longer than the stigmal; facial impression *not* bounded by a distinct arched carina superiorly.

Head with a series of moderately large punctures; axillæ very narrow, transversely wedge-shaped, with their points just meeting at base of scutellum; scutellum *with* a tuft of bristles at tip .....(79) *Eusemion* Dahlbom.

Head smooth, shining, with very fine, sparse punctures; ocelli in an acute triangle; axillæ united at base of scutellum; scutellum *without* a tuft of bristles .....(80) *Atropates* Howard.

28. Facial impression and scrobes deep, bounded by a distinct arched carina superiorly.

Scutellum *with* a tuft of bristles; stigmal and postmarginal veins very long.....(81) *Chrysoplatycerus* Ashmead.

Scutellum *without* a tuft of bristles; marginal and postmarginal veins subequal, the stigmal a little the longer eyes naked; ocelli in an acute triangle; funicle not longer than the first joint of the club.....(82) *Asteropœus* Howard.

Scutellum *without* a tuft of bristles; stigmal and postmarginal veins not long; eyes pubescent; joints of the funicle all short and rapidly widening from the narrow pedicel, the club longer than the funicle, obliquely truncate from beneath toward apex; tarsi short and somewhat thickened.

(83) *Anicetus* Howard.

Facial impression *not* bounded by an arched carina superiorly; scutellum normal; eyes pubescent; antennæ short, the scape somewhat broadly dilated toward apex; the flagellum strongly incrassated, scarcely longer than the scape, the very large club longer than the funicle, the joints of funicle annular;

[1] I am satisfied this is the genus Dr. Howard intended to name *Habrolepoidea*, and not the one which now bears the name, and through some clerical error the names were transposed. This resembles and has an affinity with *Habrolepis*, while the other has not a particle of resemblance or relationship. The name *Homalopoda* also fittingly describes the structural characteristics of the genus now bearing the name *Habrolepoidea*.

marginal vein punctiform, the stigmal and postmarginal veins very long, as in *Encyrtus* (Comys) sens. str.

(84) *Zarhopalus* Ashmead, new genus.

29. Antennæ 10-jointed, the funicle 5-jointed.

Scape linear, wholly received in the scrobes; marginal vein punctiform.

(85) *Metallon* Walker.

Antennæ 9-jointed, the funicle 4-jointed.....(86) *Cercobelus* Walker.

Antennæ 6-jointed, the funicle 3-jointed.....(87) *Coccobius* Ratzeburg.

30. Males.

Mandibles with the teeth shorter, less acute; labrum *not* conspicuous; frons punctate and frequently with a series of large, thimble-like punctures; wings often ornate, wanting or much abbreviated 34

Mandibles rather long, with acute teeth, the apical one usually larger and more acute than the other two; labrum conspicuous; frons very closely punctate or shagreened, the large punctures wanting; front wings *not* ornate, usually with a punctiform or very short marginal vein, the hind wings usually with a long costal cell, which extends to the hooklets; head rather narrow, as viewed from in front, somewhat long, subtriangular, the scrobes forming a triangle.

Postmarginal vein distinctly longer than the stigmal 33

Postmarginal vein wanting or hardly developed, the marginal vein very short or punctiform 31

31. Head, viewed from in front, not longer than wide, the cheeks not long..... 32

Head, viewed from in front, much longer than wide, the cheeks long.

Front wings *without* marginal cilia; antennæ very long and slender, the flagellar joints all very long, the sixth the shortest, but five times as long as wide.....(26) *Psilophrys* Mayr.

Front wings *with* marginal cilia.

Pedicel three or more times longer than thick at apex, the flagellum with long hairs.

Funicle joints about four times as long as thick, cylindrical; mesonotum and scutellum shagreened.

(27) *Parapsilophrys* Howard.

Funicle less than thrice as long as thick; mesonotum reticulate.

(28) *Liothorax* Mayr.

Pedicel *not* three times as long as thick, the flagellum clothed with long hairs.....(31) *Copidosoma* Ratzeburg.

32. Cheeks about half the length of the eyes; funicular joints 1-5 triangularly toothed, with long hairs.....(32) *Prionomitus* Mayr.

Cheeks very short; eyes large, rounded, pubescent; pedicel thrice as long as thick .....(33) *Archinus* Howard.

33. Mesonotum lustrous, smooth, blue or metallic.

Pedicel about thrice as long as thick, the flagellum filiform or subfiliform, with short, sparse pubescence, the funicle joints from two and a half to three times as long as thick; the first very long, four or more times longer than thick; eyes pubescent; postmarginal vein very long.

(34) *Parencyrtus* Ashmead, new genus.

34. Abdomen with the dorsum flat or concave, not rigidly pubescent 35

Abdomen subglobose or subovate, clothed with a rigid white pubescence.

Pronotum large, conical; antennæ strongly compressed, broad; wings poorly developed or wanting, not extending to middle of abdomen. (Fully developed wings probably occur.)

(35) *Mira* Schellenberg.

Pronotum not large; antennæ simple, neither compressed nor broad.

Head, seen from in front, much longer than wide; marginal vein not short; antennæ long, the flagellum subclavate, clothed with a short, dense pubescence.

(36) *Sphæropisthus* Thomson.

Head, seen from in front, *not* longer than wide; marginal vein very short, the postmarginal vein longer than the stigmal; flagellum filiform, the joints nearly thrice as long as thick.

(37) *Chestomorpha* Ashmead, new genus.

35. Head not or less distinctly lenticular, opaque, minutely, closely punctate, shagreened, or smooth and shining, at the most with only a few large punctures 39

Head transversely broad, always lenticular, the scrobes short, the punctures large, thimble-like; hind wings with the costal cell usually extending to the hooklets.

Marginal vein rarely short, at least longer than thick, and usually much longer; mesonotum smooth, impunctate, or at most shagreened 37

Marginal vein very short, punctiform, not or scarcely longer than thick; mesonotum punctate.

Mesonotum with the punctuation unlike that of the head, the punctures less dense and the surface finely coriaceous; postmarginal and stigmal veins short, subequal 36

Mesonotum with the punctuation similar to that of the head; postmarginal vein very short or subobsolete (rarely long), the stigmal vein long.

Scape normal, *without* a leaf-like expansion beneath.

Punctures on head and thorax coarse and dense.

Mesonotum very short, only about half the length of the scutellum; postmarginal vein usually as long as the stigmal; flagellum long, with long sparse hairs, not arranged in half whorls ..... (39) *Chalcaspis* Howard.

Mesonotum at least as long as the scutellum or very nearly; postmarginal vein much shorter than the stigmal; flagellum with funicle joints subexcised at apex, with half whorls of long hairs ..... (40) *Bothriothorax* Ratzeburg.

Punctures on head and thorax smaller and less dense; mesonotum a little longer than the scutellum.

(41) *Aratus* Howard.

36. Vertex and face broad, finely shagreened, and sparsely punctate; scrobes deep semicircular.

Pedicel obconical, longer than thick at apex, the flagellum subclavate, the joints, after the first, wider than long.

(42) *Pentelicus* Howard.

Pedicel very minute, the flagellum filiform, pilose, the joints subequal, about two and one-half times as long as thick.

(43) *Blepyrus* Howard.

Vertex and face very narrow, or not broad.

Head with coarse thimble-like punctures, the thorax smooth, impunctate; flagellum short, thick, filiform, clothed with a dense short pubescence, the joints wider than long.

(38) *Aenasius* Walker.

Head smooth without coarse thimble-like punctures, at the most with some sparse punctures on the vertex; flagellum long, subclavate, not thick and only sparsely pubescent.

(45) *Eurytrhopalus* Howard.

37. Marginal vein rather long, rarely shorter than the stigmal 38
Marginal vein rarely more than twice as long as thick, head with rather sparse, scattered, umbilicate punctures, the scutellum a little longer than the mesonotum.
Head not wider than the thorax between the wings; flagellum not short, filiform, and clothed with rather short sparse hairs, the funicle joints longer than wide, the first a little the longest ..... (46) *Hemencyrtus* Ashmead, new genus.
Head wider than the thorax between the wings; flagellum short, strongly clavate, as in the female; the club large and longer than the funicle, the joints of the latter minute annular.
(47) *Coccophoctonus* Ashmead, new genus.

38. Mesonotum as long as the scutellum or nearly, rarely somewhat shorter, the surface finely shagreened, at most with some feebly defined sparse punctures; marginal vein shorter than the stigmal, the latter not very short; flagellum filiform, pilose, the funicle joints about twice as long as thick; eyes bare..... (48) *Phanodiscus* Förster.
Mesonotum much shorter than the scutellum, finely delicately shagreened or rugulose especially anteriorly; marginal vein a little longer than the stigmal; flagellum subclavate, densely pubescent, the funicle joints 2–6 not longer than thick, if anything a little wider than long; eyes pubescent.
(49) *Rhytidothorax* Ashmead, new genus.

39. Antennæ inserted near the mouth border or far below the middle of the face 40
Antennæ inserted on or a little above the middle of the face.
Frons subconvex, somewhat coarsely and closely punctate; thorax rather coarsely shagreened or finely regulose; scape not extending beyond ocelli; front wings with the marginal, postmarginal and stigmal veins long, subequal.
(50) *Tanaoneura* Howard.
Frons highly convex, smooth and polished, as is also the thorax; scape long, extending far beyond the ocelli; front wings with the marginal, postmarginal, and stigmal veins rather short, the marginal thickened with a fuscous cloud or band beneath; flagellum with 6 long branches.
(51) *Hexacladia* Ashmead.

40. Antennæ with the funicle 2, 3, 4, or 5-jointed 57
Antennæ with the funicle 6-jointed (in a single case 2-jointed).
Metathorax bare, or with the lateral ridges superiorly alone pilose 44
Metathorax with the pleura and the lateral ridges always clothed with a dense silvery pubescence; body rather robust 41

41. Antennæ unlike those of the female, filiform, pilose, or with whorls of hairs, or the funicle joints dentate or subpedunculate, with whorls or fascicles of hairs 42
Antennæ similar to those of the female, filiform or at most subclavate, the club conical, strongly obliquely truncate from beneath, often white, the scape cylindrical, not at all dilated; front wings usually with a discoidal fuscous cloud or macula.
Marginal vein *not* punctiform, although short, the stigmal and postmarginal veins long, very much longer than the marginal.
(52) *Homalotylus* Mayr.
Marginal vein punctiform, the stigmal vein long, the postmarginal vein not developed or wanting..... (53) *Isodromus* Howard.

42. Marginal and postmarginal veins not very short, the former usually a little longer than the stigmal, rarely somewhat shorter.
Thorax without white lunulæ before the tegulæ 43
Thorax, with white lunulæ, or at least a dot, before the tegulæ
(54) *Cerchysius* Westwood.

43. Hind wings, with the costal cell short and narrow.
Antennæ long; the flagellum long, cylindrical, clothed with long, sparse hairs; the funicle joints long.
(55) *Sceptrophorus* Förster = *Trichomasthus* Thomson.
Hind wings with the costal cell broad and extending as far as the hooklets.
(56) *Echthroplexis* Förster.

44. Head with the frons prominent, the face inflexed; antennæ frequently compressed, dilated, broad; front wings usually with fuscous rays or fuscous with white tips, more rarely hyaline, apterous or subapterous; marginal vein usually somewhat thickened, oblong, very rarely much longer or much shorter than the stigmal, the postmarginal frequently wanting 51
Head, as seen from the side, with the frons not prominent; wings most frequently hyaline, although sometimes with transverse fuscous bands or fuscous with white bands.
Marginal vein not short, punctiform, but rarely longer than the stigmal, always more than twice longer than thick, the postmarginal most frequently well developed, rarely somewhat shorter than the marginal 45
Marginal vein very short, punctiform, rarely longer than thick, the stigmal from two and a half to three times or more longer than the marginal; the postmarginal wanting or very short, not well developed; scape slender or at most subclavate, never dilated; frons usually rather narrow, the eyes, as seen from in front, slightly converging above.
Flagellum with the hairs on the funicle joints not arranged in half whorls.
Lateral ocelli touching the eye margin; flagellum with long hairs.
Eyes bare; postmarginal vein not developed or so slightly developed as not to be considered.
(57) *Oencyrtus* Ashmead, new genus.
Eyes pubescent; postmarginal vein as long as the marginal.
(66) *Ageniaspis* Dahlbom (part).
Lateral ocelli not close to the eye margin; postmarginal vein somewhat developed; flagellum filiform, with a short pubescence.
(58) *Psyllaphagus* Ashmead.
Flagellum with the hairs on the funicle joints arranged in half whorls.
(59) *Coccidencyrtus* Ashmead, new genus

45. Species metallic or submetallic 46
Species *not* metallic; head and thorax opaque or subopaque, alutaceous, closely microscopically punctate or shagreened, and pubescent.
Postmarginal vein present.
Pedicel longer than the first joint of funicle; flagellum clothed with hairs, the funicle joints, except its first two or three, not or scarcely longer than thick .....(60) *Aphycus* Mayr.
Pedicel very short; flagellum elongate, the club only slightly enlarged, the funicle joints elongate, cylindrical, and clothed with sparse, long hairs.....(61) *Heterarthrellus* Howard.
Postmarginal vein wanting.

Pedicel as long as the first funicle joint; flagellum subclavate, the club not quite so long as funicle joints 4–6 united, first joint of funicle the longest, the following gradually shortening, clothed with a short, rather dense pubescence.

(62) *Astymachus* Howard.

46. Thorax *without* a scaly pubescence and *without* white lunulæ before the tegulæ. 47
Thorax *with* a scaly pubescence and *with* white lunulæ before the tegulæ.

Flagellum elongate, the funicle joints long, excised or subexcised at apex with whorls of long hairs .....(63) *Blastothrix* Mayr.

47. Scape normal, not expanded or dilated beneath, at the most subclavate; wings hyaline 48
Scape usually dilated or expanded beneath, or at least with a carina, rarely simple, unlike the female; wings fuscous or subfuscous, with transverse hyaline bands, rarely hyaline.

Thorax smooth but microscopically coriaceous, with sparse punctures scattered over the surface; frons with a series of punctures, especially on the orbits .....(64) *Microterys* Thomson.

48. Thorax finely coriaceous, subopaque, without punctures scattered over the surface; frons punctate; scutellum with a delicate impressed median line; wings pubescenct, with an oblique hairless line from base of stigmal vein; flagellum subfiliform, clothed with a short, dense pubescence, the funicle joints a little wider than long.

(65) *Holcencyrtus* Ashmead, new genus.

Thorax smooth, impunctate, or at the most microscopically reticulate, or with fine longitudinal striæ on the mesonotum.

Mesonotum smooth, impunctate, or at the most microscopically reticulate. 49
Mesonotum with fine longitudinal striæ.

Stigmal vein scarcely longer than the marginal, the postmarginal vein longer than the marginal and stigmal veins united; eyes pubescent .....(66) *Ageniaspis* Dahlbom.

49. Stigmal vein very short, *not* or scarcely so long as the marginal and postmarginal veins united; axillæ meet at their inner basal angles . 50
Stigmal vein much longer than the marginal, as long or longer than the marginal and postmarginal veins united; axillæ do not quite meet at their inner basal angles.

Antennæ with the scape rather short and stout, not reaching to the front ocelli, the flagellum elongate filiform, clothed with sparse moderately long hairs, the funicle joints about thrice as long as thick, or nearly.

(67) *Pseudencyrtus* Ashmead, new genus.

Antennæ with the scape long, slender, reaching to or beyond the front ocelli, the flagellum elongate, filiform, the funicle joints more than twice longer than wide, with long sparse hairs; scutellum shagreened or striate.

(64) *Microterys* Thomson (part).

50. Stigmal vein *not* longer than the marginal and postmarginal veins united, usually distinctly shorter, the postmarginal very short, or shorter than the stigmal...(68) *Epiencyrtus* Ashmead, new genus.

Antennæ with the scape short, not extending beyond the middle of the face, the flagellum filiform, sparsely pilose, the funicle joints about two and a half times as long as thick; lateral ocelli about or nearly twice their width from eye margin.

(69) *Syrphophagus* Ashmead, new genus.

Stigmal vein very short, scarcely so long as the marginal and postmarginal united, the former being not more than or hardly twice as

long as thick, the postmarginal never well developed, although acuminate and longer than the short marginal. Flagellum filiform, pilose, the joints of funicle about twice as long as thick; lateral ocelli at least their width from eye margin.
(70) *Aphidencyrtus* Ashmead, new genus.

51. Scutellum neither triangular nor acute at apex 51
Scutellum triangular, acute at apex.
Antennæ simple, subfiliform, pubescent .....(71) *Choreia* Westwood.

52. Funicle 6-jointed 53
Funicle 2-jointed, the club unusually long and cylindrical (teste Mayr).
(77) *Habrolepis* Förster.

53. Head with vertex antero-posteriorly broad, the face much inflexed, the frons regularly punctate; antennæ with the scape and flagellum usually strongly compressed, broad; wings fuscous or with fuscous rays 54
Head always semiglobose, the face less distinctly inflexed, the scrobes always forming a semicircle; antennæ simple, filiform, the joints long, cylindrical, distinctly separated and hairy, rarely slightly compressed; wings usually fusco-radiate or partly fuscous, rarely entirely hyaline.
Scape elongate, extending to or beyond the middle ocellus, the flagellum very long, clothed with rather long hairs.
(72) *Cheiloneurus* Westwood = *Sterrhocoma* Förster, male.

54. Wings fuscous, with narrow white tips 55
Wings hyaline, the marginal vein rather long, stout, as long as the stigmal vein, the latter not short, the postmarginal not developed; antennæ long, filiform, the flagellum with sparse moderately long hairs; funicle joints 1–6 constricted at apex or subpedunculate, somewhat similar to the male in *Eurytoma* .....(76) *Cerapterocerus* Westwood.

55. Marginal vein shorter than the stigmal 56
Marginal vein longer than the stigmal.
Facial impression not bounded by a distinct carina superiorly.
(79) *Ensemion* Dahlbom.

56. Facial impression and scrobes deep, bounded by a high carina superiorly.
Scutellum with a tuft of bristles; stigmal and postmarginal veins very long.
(80) *Chrysoplatycerus* Ashmead.
Scutellum *without* a tuft of bristles; stigmal and postmarginal veins not long .....(83) *Anicetus* Howard.
Facial impression not bounded by a carina superiorly.
(84) *Zarhopalus* Ashmead, new genus.

57. Antennæ 10-jointed, with a 5-jointed funicle .....(85) *Metallon* Walker.
Antennæ 9-jointed, the funicle 4-jointed .....(86) *Cercobelus* Walker.
Antennæ 6-jointed, the funicle 3-jointed .....(87) *Coccobius* Ratzeburg.
Antennæ 5-jointed, the funicle 2-jointed, the club unusually long and cylindrical .....(77) *Habrolepis* Förster.

Tribe IV. ARRHENOPHAGINI.

This tribe is proposed for two genera differing decidedly from the other tribes in mandibular characters, as well as in general habitus. The mandibles are acutely pointed or conical, and edentate: the tarsi 4 or 5 jointed; while the marginal vein is wanting or punctiform, the postmarginal vein wanting, the stigmal vein sometimes present.

TABLE OF GENERA.

Tarsi 4-jointed 2
Tarsi 5-jointed.
Front wings with the marginal vein punctiform, the postmarginal wanting, the stigmal rather short and curved; female with 10-jointed antennæ, the funicle 5-jointed, joints 1–3 small, wider than long; ovipositor exserted. (88) *Rhopoideus* Howard.
2. Front wings with the marginal and stigmal veins wanting, the subcostal vein not quite attaining the costal edge and terminating in a stigma, female with 3-jointed, male with 9-jointed antennæ.....(89) *Arrhenophagus* Aurivillius.

Subfamily II. ENCYRTINÆ.

Tribe I. ECTROMINI.

1. CALOCERINUS Howard.

1892. *Calocerinus* HOWARD, Proc. U. S. Nat. Mus., XV, p. 269.

1. CALOCERINUS FLORIDANUS Ashmead.

(Type, *Tetracnemus floridanus* Ashmead.)

Tetracnemus floridanus ASHMEAD, Tr. Am. Ent. Soc., XVII, 1885, Proc., p. xviii, male.
Calocerinus floridanus HOWARD, Proc. U. S. Nat. Mus., XV, 1892, p. 368.

Type.—Cat. No. 4718, U.S.N.M. (Ashmead collection.)
Habitat.—Florida: Jacksonville.

2. TETRALOPHIDEA Ashmead, new genus.

(Type, *Tetralophidea bakeri* Ashmead.)

This genus comes nearest to *Calocerinus* Howard, but the head is not quite so large nor so broad proportionately; the lateral ocelli are more distant from the eye margin, being about three times as far from the eye margin as their diameter; the pronotum is shorter; the mesonotum and scutellum are less convex; the wings are clear hyaline, not fuscous with white bands, as in *Calocerinus*; while the abdomen is proportionately longer.

The genus is readily separated from *Calocerinus*, the only one with which it shows any affinity, by the hyaline wings and the position of the ocelli.

1. TETRALOPHIDEA BAKERI Ashmead, new species.

Male.—Length, 1.5 to nearly 2 mm. Head and thorax aeneous black, the mesopleura blue; mandibles dark rufous or ferruginous, bidentate; legs aeneous with all the tarsi brown-black or dark fuscous. Head and thorax above with a distinct metallic luster, and microscopically reticulate or shagreened, the face with some scattered punctures. Antennæ 11-jointed, inserted below the middle of the face, the flagellum with four long pilose branches, a branch on joints 1–4; pedicel obconical, scarcely longer than thick at apex, funicle 6-jointed, the first joint annular, the fourth elongate, more than twice longer than the three preceding, the

fifth and sixth also elongate, but shorter than the fourth; club fusiform, indistinctly 3-jointed. Mesonotum subdepressed in front of the scutellum; axillæ not quite meeting at base of scutellum; metathorax short, with the hind angles smooth, bare. Wings hyaline, the venation mostly dark-brown or piceous, the submarginal vein, except at apex, pale yellowish; marginal vein about thrice as long as the stigmal, the postmarginal short, not longer than the stigmal, the latter being short, subpetiolate and ending in a knob. Legs aeneous black, the hind coxæ metallic green, the tarsi brown-black or fuscous, the anterior and middle tarsi basally and the middle tibial spur, yellowish.

Types.—Cat. Nos. 5082–5085, U.S.N.M. (Carl F. Baker collection.)

Habitat.—Colorado.

3. MEROMYZOBIA Ashmead, new genus.

(Type, *Ericydnus maculipennis* Ashmead.)

Stature and general appearance of *Ericydnus* Walker, but readily distinguished from it and allied genera by its antennal characters, the funicle being only 4-jointed, with two small ring-joints. It is the only genus in the tribe *Ectromini* with two ring-joints, and includes wingless or subapterous forms, as well as those with wings fully developed.

Head transverse, viewed from in front rounded, the frons subconvex, finely shagreened or coriaceous, with a few minute punctures scattered over the surface. Mandibles bidentate. Antennæ 11-jointed—scape, pedicel, two ring-joints, a 4-jointed funicle, and a 3-jointed club. Pronotum conical, the hind margin obtusely triangularly emarginate; mesonotum smooth, a little wider than long; scutellum about two-thirds the length of the mesonotum, with the axillæ touching each other at their inner basal angles; metathorax short, about one-third the length of the scutellum, smooth. Winged form with the wings hyaline, but banded, or at least maculate with fuscous; the marginal vein is somewhat long, linear; the stigmal is always shorter than the marginal and issues obliquely at an angle of less than 30 degrees; the postmarginal vein is a little longer than the stigmal, but shorter than the marginal. Abdomen conic-ovate, and usually a little longer than the thorax.

The species in this genus, whose parasitism is known, destroy Dipterous larvæ belonging to the genus *Meromyza*. The following are the species of our fauna:

1. MEROMYZOBIA AMERICANA Ashmead.

Prionomastix americana ASHMEAD, Ent. Amer., IV, 1888, p. 16, male.—DALLA TORRE Cat. Hym., V, 1898, p. 265.

Type.—Cat. No. 4719, U.S.N.M. (Ashmead collection.)

Habitat.—Florida.

2. MEROMYZOBIA BIFASCIATA Ashmead.

Homalotylus bifasciatus ASHMEAD, Bull. No. 1, Colo. Biol. Assoc., 1890, p. 28, female.—DALLA TORRE Cat. Hym., V, 1898, p. 246.

Type.—Cat. No. 4720, U.S.N.M. (Ashmead collection.)
Habitat.—Colorado.

3. MEROMYZOBIA FLAVICINCTA Ashmead.

Chorcia flavicincta ASHMEAD, Ent. Amer., IV, 1888, p. 17, female.—DALLA TORRE Cat. Hym., V, 1898, p. 248.

Type.—Cat. No. 4721, U.S.N.M. (Ashmead collection.)
Habitat.—Florida.

4. MEROMYZOBIA MACULIPENNIS Ashmead.

Ericydnus maculipennis ASHMEAD, Bull. Ohio Exper. Sta., I, 1893, p. 162, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 249.

Type.—Cat. No. 4722, U.S.N.M. (Ashmead collection.)
Habitat.—Ohio.
Host.—Dipt.: *Meromyza americana* Fitch; *?Chlorops ingrata* Williston.

5. MEROMYZOBIA FLAVA Ashmead, new species.

Male.—Length, 1.6 mm. Brownish-yellow; the trochanters, base of hind tibiæ, tibial spurs and tarsi, except terminal joints, yellowish white; eyes purplish brown; flagellum brown; wings hyaline, the marginal and stigmal veins brown. Abdomen short oval.

Antennæ 9-jointed (scape, pedicel, 4 funicle joints and an indistinctly 3-jointed club); the flagellum is subcompressed, the joints of the funicle about thrice as long as wide or the fourth is somewhat shorter; the club is longer than the slender scape, 3-jointed, but the sutures separating the joints are made out with difficulty; the pedicel is very small, hardly longer than thick.

Type.—Cat. No. 4723, U.S.N.M. (Ashmead collection.)
Habitat.—District of Columbia.

6. MEROMYZOBIA UNIFASCIATA Ashmead, new species.

Female.—Length, 2 mm. Brownish-yellow; the middle lobe of scutellum, the metanotum, and the middle tibiæ, except distal ends, obfurcated; hind femora, their tibiæ, except basal two-thirds, which is white, and their tarsi, fuscous. Abdomen black, with the basal segment yellowish. Wings, hyaline, with a large discoidal fuscous cloud beneath the marginal and stigmal veins.

Type.—Cat. No. 4724, U.S N.M. (Ashmead collection.)
Habitat.—Mississippi: Utica.

4. CHRYSOPOPHAGUS Ashmead.

1894. *Chrysopophagus* ASHMEAD, Ins. Life, VII, p. 246.
(Type, *Chrysopophagus compressicornis* Ashmead.)

1. CHRYSOPOPHAGUS BANKSI Howard.

Chrysopophagus banksi HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, p. 247, female.

Type.—Cat. No. 3851, U.S.N.M.
Habitat.—Texas: College Station; New Mexico: Mesilla Park.

2. CHRYSOPOPHAGUS COMPRESSICORNIS Ashmead.

Chrysopophagus compressicornis ASHMEAD, Ins. Life, VII, 1894, p. 246, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 267.

Type.—Cat. No. 1465, U.S.N.M.
Habitat.—Mississippi: Utica.
Host.—Neurop.: *Chrysopa attenuata* Walker.

5. TINEOPHOCTONUS Ashmead, new genus.

(Type, *Phænodiscus armatus* Ashmead.)

This genus also resembles *Ericydnus* Walker, but the abdomen is longer, more compressed, and terminates in a long, prominent ovipositor, while the venation of the front wings is different, the marginal vein being long, linear, while the stigmal and postmarginal veins are very short.

Two species belong here, *Phænodiscus armatus* Ashmead, and *Leptomastix tineævora* Ashmead, the latter being based upon a specimen that had the ovipositor broken off.

1. TINEOPHOCTONUS ARMATUS Ashmead.

Phænodiscus armatus ASHMEAD, Ent. Amer., IV, 1888, p. 17, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 229.

Type.—Cat. No. 4725, U.S.N.M. (Ashmead collection.)
Habitat.—Florida.

2. TINEOPHOCTONUS TINEÆVORA Ashmead.

Leptomastix tineævora ASHMEAD, Tr. Am. Ent. Soc., XIV, 1887, p. 191, female; Ent. Amer., IV, 1888, p. 16, female.—DALLA TORRE, Cat. Hym., V, p. 253.

Type.—Cat. No. 4726, U.S.N.M. (Ashmead collection.)
Habitat.—Florida: Jacksonville.
Host.—Lepid.: Tineid sp. living in galls of *Andricus pattoni* Bassett.

6. ERICYDNUS Walker.

1837. *Ericydnus* WALKER, Ent. Mag., IV, p. 363.
1860. *Pezobius* FÖRSTER, Verh. d. naturh. Ver. pr. Rheinl., XVII, p. 129 (wingless form).

(Type, *Encyrtus longicornis* Dalman.)

1. ERICYDNUS ÆNEIVENTRIS Walker.

Encyrtus æneiventris WALKER, Ent. Mag., IV, 1837, p. 447, female.
Pezobius polychromus FÖRSTER, Verh. naturh. Ver. pr. Rheinl., XVII, 1860, p. 130, female.
Ericydnus æneiventris MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, pp. 764, 765, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 249.

Habitat.—Europe.

2. ERICYDNUS CHRYSCUS Walker.

Pteromalus? chryscus WALKER, Monogr. Chalcid., II, 1839, p. 34, female.
Ericydnus chryscus WALKER, List Hym. Brit. Mus. Chalc., I, 1846, p. 53.—DALLA TORRE, Cat. Hym., V, 1898, p. 249.

Habitat.—Australia.

3. ERICYDNUS LATIUSCULUS Thomson.

Ericydnus latiusculus THOMSON, Hym. Skand., IV, 1875, p. 125, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 249.

Habitat.—Europe: Sweden.

4. ERICYDNUS LONGICORNIS Dalman.

Encyrtus longicornis DALMAN, Svensk. Vet.-Akad. Handl., XLI, 1820, p. 165, male.
Encyrtus strigosus NEES, Hym. Ichn. Affin. Monogr., II, 1834, p. 227, female.—WALKER, Ent. Mag., IV, 1837, p. 364.
Encyrtus longicornis NEES, Hym. Ichn. Affin. Monogr., II, p. 251, male.
Encyrtus baleus WALKER, The Entomologist, 1841, pl. H. fig. 1, female.
Encyrtus longicornis RATZEBURG, Ichn. d. Forstins., I, 1844, p. 192, female.
Ericydnus amnestus WALKER, Ann. Mag. Nat. Hist. (2), V, 1850, p. 133, female.
Ericydnus strigosus WALKER, Notes on Chalcid., Pt. 5, 1872, p. 72, fig.; The Entomologist, VI, 1872, p. 113, fig.
Ericydnus longicornis MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, pp. 763, 764, female.—THOMSON, Hym. Skand., IV, 1875, p. 124, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 249.

Habitat.—Europe.

5. ERICYDNUS MEGALARUS Walker.

Eulophus megalarus WALKER, Ent. Mag., V, 1838, p. 477, female.
Ericydnus megalarus WALKER, List Hym. Brit. Mus. Chalcid., I, 1846, p. 54.—DALLA TORRE, Cat. Hym., V, 1898, p. 249.

Habitat.—Australia

6. ERICYDNUS REINHARDII Mayr.

Ericydnus reinhardii MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, pp. 764, 765.—DALLA TORRE, Cat. Hym., V, 1898, p. 249.

Habitat.—Europe: Austria.

7. ERICYDNUS VENTRALIS Dalman.

Encyrtus longicornis var. *ventralis* DALMAN, Svensk. Vet.-Akad. Handl., XLI, 1820, p. 166.
Ericydnus paladatus WALKER, Ent. Mag., IV, 1837, p. 363, female and male.—BLANCHARD, Hist. nat. d. Ins., III, 1840, p. 276.—WESTWOOD, Intr. Mod. Class. Ins., II, 1840, Synop., p. 72.—SIX, Tijdschr. v. Entom., 1876, p. 134, female; pl. 6, fig. 1.
Ericydnus ventralis MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, pp. 764, 765, female and male.—THOMSON, Hym. Skand., IV, 1875, p. 125.—DALLA TORRE, Cat. Hym., V, 1898, p. 250.

Habitat.—Europe.
Host.—Rhynch.: *Pulvinaria vitis* Linnæus.

7. LEPTOMASTIX Förster.

1856. *Leptomastix* FÖRSTER, Hym. Stud., II, p. 34.

(Type, *Leptomastix histrio* Mayr.)

1. LEPTOMASTIX DACTYLOPII Howard.

Leptomastix dactylopii HOWARD, Bull. No. 5, U. S. Dept. Agric., Div. Ent., 1885, p. 36, female and male.—CRESSON, Syn. Hym., N. A., 1887, p. 239.—DALLA TORRE, Cat. Hym., V, 1898, p. 253.

Type.—Cat. No. 2649, U.S.N.M.

Habitat.—District of Columbia; West Indies; Grenada.

Host.—Rhynch.: *Dactylopius destructor* Comstock.

2. LEPTOMASTIX HISTRIO Mayr.

Leptomastix histrio MAYR, Verh. Zool.-Bot. Ges. Wien, XXV, 1875, p. 730, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 253.

Habitat.—Europe.

8. DINOCARSIS Förster.

1856. *Dinocarsis* FÖRSTER, Hym. Stud., II, p. 33.
1857. *Euscapus* DAHLBOM, Öfvers. Svensk. Vet.-Akad. Förh., XIV, p. 292.

(Type, *Encyrtus hemipterus* Dahlbom.)

1. DINOCARSIS THYRIDOPTERYGIS Ashmead.

Dinocarsis thyridopterygis ASHMEAD, Can. Ent., XVIII, 1886, p. 97, female. CRESSON, Syn. Hym. N. A., p. 240.—DALLA TORRE, Cat. Hym., V, p. 248.

Type.—Cat. No. 4727, U.S.N.M. (Ashmead collection.)

Habitat.—Florida: Jacksonville.

Host.—Lepid.: *Thyridopteryx ephemeraeformis* Haworth.

9. ECTROMA Westwood.

1833. *Ectroma* WESTWOOD, Phil. Mag. (3), III, p. 344.
1834. *Sphenolepis* NEES, Ichn. Hym. Affin. Monogr., II, 1834, p. 256.
1856. *Aglyptus* FÖRSTER, Hym. Stud., II, p. 33.

(Type, *Eupelmus rufus* Dalman.)

1. ECTROMA AMERICANUM Howard.

Ectroma americanum HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, p. 248, female.

Type.—Cat. No. 3852, U.S.N.M.

Habitat.—New Mexico: Mesilla.

2. ECTROMA DUNENSE Six.

Etroma dunense SIX, Tijdschr. v. Ent., XIX, 1876, p. 134, pl. VI, fig. 2.—DALLA TORRE, Cat. Hym., V, 1898, p. 238.

Habitat.—Europe: Bavaria.

3. ECTROMA MADERENSE Walker.

Ectroma maderense WALKER, Notes on Chalcid., Pt. 7, p. 116, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 238.

Habitat.—Africa: Madeira.

4. ECTROMA PYGMÆUM Nees.

Sphenolepis pygmæa NEES, Ichn. Hym. affin. Monogr., II, 1834, p. 256, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 249.

Habitat.—Europe.

5. ECTROMA REATE Walker.

Encyrtus reate WALKER, Ann. and Mag. Nat. Hist., XX, 1847, p. 22, male.—CRESSON, Syn. Hym. N. A., 1887, p 239.—DALLA TORRE, Cat. Hym., V, 1898, p. 262.

Habitat.—Florida.

6. ECTROMA RUFUM Dalman.

Eupelmus? rufus DALMAN, Svensk. Vet. Akad. Handl., XLI, 1820, p. 383, female.
? Eupelmus rufescens NEES, Hym. Ichn. affin. Monogr., II, 1834, p. 80.
? Ectroma rufescens NEES, Hym. Ichn. affin. Monogr., II, 1834, p. 420, male.
Encyrtus lindus WALKER, Ent. Mag., IV, 1837, p. 451, female.
Ectroma rufus WESTWOOD, Intrs. Mod. Class. Ins., II, 1840, Syn., p. 72, male.
Aglyptus lindus FÖRSTER, Hym. Stud., II, 1856, p. 36.
Dicelloceras rufescens SIX, Tijdschr. v. Ent., X, 1867, p. 221, pl. 10, fig. K.
? Ectroma rufescens WALKER, Notes on Chalc., Pt. 5, 1872, pp. 74, 78, fig.; The Entomologist, VI, 1872, p. 131, fig.
Ectroma rufa THOMSON, Hym. Skand., IV, 1875, p. 126.
Ectroma rufum MAYR, Verh. Zool.-bot. Ges., XXV, 1875, p. 767, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 238.

Habitat.—Europe.

10. ANAGYRUS Howard.

1896. *Anagyrus* HOWARD, Proc. U. S. Nat. Mus., XVIII, p. 638.

(Type, *Anagyrus greenii* Howard.)

1. ANAGYRUS GREENII Howard.

Anagyrus greenii HOWARD, Proc. U. S. Nat. Mus., XVIII, 1896, p. 639, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 266.

Type.—Cat. No. 3257, U.S.N.M.
Habitat.—Ceylon.
Host.—Rhynch.: *Maskellia zonata* Green.

2. ANAGYRUS PALLIDIPES Ashmead, new species.

Male.—Length, 1.8 mm. Black, with some sparse silvery hairs on thorax above and on metapleura; antennæ black but the club is wholly white and there is a white annulus at apex of the scape; the latter has a very broad leaf-like expansion beneath; legs, except the hind coxæ, brownish-yellow; wings hyaline, the venation brown.

Type.—Cat. No. 4728, U.S.N.M. (Ashmead collection.)
Habitat.—District of Columbia.

3. ANAGYRUS PULCHER Ashmead.

Dinocarsis pulcher ASHMEAD, Ent. Amer., IV, 1888, p. 17, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 248.

Type.—Cat. No. 4729, U.S.N.M. (Ashmead collection.)
Habitat.—Florida.

4. ANAGYRUS PULCHRICORNIS Howard.

Cerchysius pulchricornis HOWARD, Journ. Linn. Soc. Lond. Zool., XXV, p. 87, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 244.

Type in British Museum.

Habitat.—West Indies: St. Vincent.

5. ANAGYRUS TEREBRATUS Howard.

Cerchysius terebratus HOWARD, Journ. Linn. Soc. Lond. Zool., XXV, 1894, p. 87, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 244.

Type in British Museum.

Habitat.—West Indies: St. Vincent.

11. ANUSIA Förster.

1856. *Anusia* FÖRSTER, Hym. Stud., II, p. 32.

(Type, *Ectroma fulvescens* Westwood.)

1. ANUSIA FULVESCENS Westwood.

Ectroma fulvescens WESTWOOD, Phil. Mag. (3), III, 1833, p. 344.

Anusia nasicornis FÖRSTER, Verh. naturh. Ver. pr. Rheinl., XVIII, 1860, p. 133, female.

Anusia austriaca FÖRSTER, Verh. naturh. Ver. Rheinl., XVIII, 1860, p. 133, female.

Anusia fulvescens MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, p. 769, female.

Habitat.—Europe.

2. ANUSIA HEYDENII Mayr.

Anusia heydenii MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, p. 770, female.—DALLA TORRE Cat. Hym., V, 1898, p. 237.

Habitat.—Europe.

3. ANUSIA NEOMEXICANA Ashmead, new species.

Female.—Length, 1.65 mm. Ferruginous, with metallic or violaceous reflections, and clothed with a silvery pubescence; scutellum croceous; mesopleura posteriorly golden, the metapleura clothed with a dense silvery pile; hind legs brown, the coxæ violaceous. Flagellum compressed fusiform, not longer than the large foliaceously dilated scape, black; all the funicle joints are wider than long. Scape and pedicel reddish-brown.

Type.—Cat. No. 4730, U.S.N.M. (Ashmead collection.)

Habitat.—New Mexico: Las Cruces.

Described from a single specimen taken by Prof. T. D. A. Cockerell.

12. HENICOPYGUS Ashmead, new genus.

(Type, *Henicopygus subapterus.*)

Allied to *Meromyzobia* and *Ericydnus*, but differs decidedly in the much larger, broader head, in having the lateral ocelli much farther away from the eye margin, the flagellum broader, strongly compressed,

the axillæ separated, not meeting at base of the scutellum, while the abdomen is strongly compressed, a little longer than the head and thorax united, with a prominent, exserted ovipositor and a large, prominent lanceolate hypopygium, which projects far beyond the tip of the abdomen. Wings much abbreviated, hardly developed.

1. HENICOPYGUS SUBAPTERUS Ashmead, new species.

Female.—Length, 2–2.5 mm.; to tip of ovipositor, about 3 mm. Ground color of head, thorax, and legs is ferruginous, but the head above the antennæ, including the vertex, and the thorax above are bronzed or metallic brown; the mesopleura superiorly show a decided violaceous tinge, while the abdomen is black above, blue-black beneath; the ovipositor black at apex, whitish on basal two-thirds.

The small joints, upon which the antennæ are inserted, are unusually long, well developed, black; scape brownish-yellow, the pedicel and flagellum black. Wings very short, scarcely developed, and not extending to the apex of the first abdominal segment, brown, but with a white transverse band near the middle.

Type.—Cat. No. 5083, U.S.N.M. (Carl F. Baker collection.)

Habitat.—Colorado.

13. BÆOCHARIS Mayr.

1875. *Bæocharis* MAYR, Verh. Zool.-bot. Ges. Wien, XV, p. 767.

(Type, *Bæocharis pascuorum* Mayr.)

1. BÆOCHARIS PASCUORUM Mayr.

Bæocharis pascuorum (FÖRSTER) MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, p. 768, female and male.—VOLLENHOVEN, Pinacogr., 1878, p. 55, pl. 35, fig. 9.—WACHTL, Wien. ent. Zeitg., I, 1882, p. 298.—DALLA TORRE, Cat. Hym., V, 1898, p. 239.

Habitat.—Europe.

The species *Bæocharis marlatti* Ashmead, is an Aphelinine and does not belong here.

14. STENOTERYS Thomson.

1875. *Stenoterys* THOMSON, Hym. Skand., IV, pp. 115, 128.

(Type, *Stenoterys orbitalis* Thomson.)

This genus is unknown to me in nature, and is included in my table from Thomson's description alone. It seems to come very close to *Leptomastix* Förster.

1. STENOTERYS ORBITALIS Thomson.

Stenoterys orbitalis THOMSON, Hym. Skand., IV, 1875, p. 129, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 238.

Habitat.—Europe.

15. TETRACNEMOIDEA Howard.

1898. *Tetracnemoidea* HOWARD, Proc. U. S. Nat. Mus., XXI, p. 232.
(Type, *Tetracnemoidea australiensis* Howard.)

1. TETRACNEMOIDEA AUSTRALIENENSIS Howard.

Tetracnemoidea australiensis HOWARD, Proc. U. S. Nat. Mus., XXI, p. 232, female and male.

Type.—Cat. No. 5022, U.S.N.M.
Habitat.—Australia: Sidney.
Host.—Rhynch.: *Dactylopius* sp. on *Pittsporum*.

16. TETRACNEMUS Westwood.

1837. *Tetracnemus* WESTWOOD, Mag. Nat. Hist., I, p. 258.
(Type, *Tetracnemus diversicornis* Westwood.)

1. TETRACNEMUS DIVERSICORNIS Westwood.

Tetracnemus diversicornis WESTWOOD, Mag. Nat. Hist., I, 1837, p. 258, male, fig. 25.—WESTWOOD, Intro. Mod. Class. Ins., II, 1840, synop., p. 73.—HOWARD, Ins. Life, III, 1890, p. 149, fig. 21.—HOWARD, Proc. U. S. Nat. Mus., XV, 1892, p. 363.—DALLA TORRE, Cat. Hym., V, 1898, p. 230.

Habitat.—Europe: England, Germany (Ashmead).

17. HABROLEPOIDEA Howard.

1894. *Habrolepoidea* HOWARD, Journ. Linn. Soc. Lond. Zool., XXV, p. 89.
(Type, *Habrolepoidea glauca* Howard.)

1. HABROLEPOIDEA GLAUCA Howard.

Habrolepoidea glauca HOWARD, Journ. Linn. Soc. Lond. Zool., XXV, p. 90, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 240.

Type.—Cat. No. 2717, U.S.N.M.; also in British Museum.
Habitat.—West Indies: St. Vincent.

18. TETRALOPHIELLUS Ashmead, new genus.

(Type, *Tetralophiellus brevicollis*.)

This genus is allied to *Tetracladia* Howard, but may be easily separated by the longer marginal vein, which is about three times as long as the stigmal, by the axillæ, which meet at their inner basal angles, and by the much shorter pronotum, which is scarcely visible from above.

1. TETRALOPHIELLUS BREVICOLLIS Ashmead, new species.

Male.—Length, 1.2 mm. Bronzed green, the mesopleura bluish or purplish; legs brown-black, all tibiæ with a white annulus at base, the tips of anterior and middle tibiæ and all tarsi, except the last joint, whitish. The antennæ are black, with funicle joints 1–4 each, furnished with a long, hairy branch. Head shagreened, the mesonotum scaly-punctate, the scutellum smoother but with delicate reticulate lines. Wings hyaline, the veins brown.

Type.—Cat. No. 4731, U.S.N.M. (Ashmead collection.)
Habitat.—Florida: Jacksonville.

19. TETRACLADIA Howard.

1892. *Tetracladia* HOWARD, Proc. U. S. Nat. Mus., XV, p. 367.
(Type, *Tetracladia texana* Howard.)

1. TETRACLADIA GRACILIS Howard.

Tetracladia gracilis HOWARD, Proc. U. S. Nat. Mus., XV, 1892, p. 368, male.—DALLA TORRE, Cat. Hym., V, 1898, p. 230.

Type.—Cat. No. 1486, U.S.N.M. (Ashmead collection.)
Habitat.—Florida.

2. TETRACLADIA TEXANA Howard.

Tetracladia texana HOWARD, Proc. U. S. Nat. Mus., XV, 1892, p. 367, male.—DALLA TORRE, Cat. Hym., V, p. 230.

Type.—Cat. No. 1485, U.S.N.M.
Habitat.—Texas.

20. TETRACNEMOPSIS Ashmead, new genus.

(Type, *Tetracnemus westwoodii* Cockerell.)

Differs from *Tetracnemus* Westwood in having the marginal vein fully twice as long as thick, about half the length of the stigmal, the postmarginal vein developed, the pronotum transverse linear, the scutellum longer than the mesonotum, while the axillæ meet just in front of the scutellum.

The female, which was unknown to Cockerell, has the head, seen from in front, longer than wide, the eyes large, the face and forehead narrowed; the antennæ are 11-jointed, inserted close to the clypeus with a distinct carina between, the scape obclavate, the flagellum clavate, the club enlarged, ovate, thrice as thick as the funicle; while the hypopygium is prominent, plowshare shaped, and projects considerably beyond the tip of abdomen.

The pedicel and first four joints of funicle are white, the scape, last two joints of funicle and the club, dark brown.

1. TETRACNEMOPSIS WESTWOODII Cockerell.

Tetracnemus westwoodii COCKERELL, Can. Ent., XXX, 1898, p. 224, male.

Cotype (male).—Cat. No. 4847, U.S.N.M.
Type (female).—Cat. No. 4732, U.S.N.M.
Habitat.—Colorado: Fort Collins. (C. P. Gillette.)

21. PENTACNEMUS Howard.

1892. *Pentacnemus* HOWARD, Proc. U. S. Nat. Mus., XV, p. 366.

(Type, *Pentacnemus bucculatricis* Howard.)

1. PENTACNEMUS BUCCULATRICIS Howard.

Pentacnemus bucculatricis HOWARD, Proc. U. S. Nat. Mus., XV, 1892, p. 366.—DALLA TORRE, Cat. Hym., V, 1898, p. 230.

Type.—Cat. No. 1488, U.S.N.M.
Habitat.—Missouri.
Host.—Lepid.: *Bucculatrix thuiella* Packard.

22. HABROLEPOPTERYX Ashmead, new genus.

(Type, *Psilophrys pulchripennis* Ashmead.)

The colorational pattern of the front wings in this genus is similar to that in *Habrolepis* Förster, but otherwise there is not a particle of affinity between the two genera, since structurally they are widely separated.

The species was originally described in the genus *Psilophrys* on account of the long head. It has, however, no relation whatever with that genus, not even belonging to the same tribe.

The rather full structural characters given in my table render a fuller description here unnecessary, since no one could go astray in placing so characteristic a genus.

1. HABROLEPOPTERYX PULCHRIPENNIS Ashmead.

Psilophrys pulchripennis ASHMEAD, Ent. Amer., IV, 1888, p. 16, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 253.

Type.—Cat. No. 4733, U.S.N.M. (Ashmead collection.)
Habitat.—Florida: Jacksonville.

Tribe II. ENCYRTINI.

23. ENCYRTUS Latreille.

1809. *Encyrtus* LATREILLE, Gen. Crust. et Ins., IV, p. 31.
1856. *Eucomys* FÖRSTER, Hym. Stud., II, p. 32.
1856. *Comys* FÖRSTER, Hym. Stud., p. 144.
1898. *Eucomys* DALLA TORRE, Cat. Hym., V, p. 239.

(Type, *Chrysis infidus* Rossi=*Comys scutellata* Swederus.)

1. ENCYRTUS ALBICOXA Ashmead.

Comys albicoxa ASHMEAD, Tr. Am. Ent. Soc., XII, 1885, Proc., p. xvi, female and male.—CRESSON, Syn. Hym. N. A., 1887, p. 239.
Eucomys albicoxa DALLA TORRE, Cat. Hym., V, 1898, p. 239.

Type.—Cat. No. 4734, U.S.N.M. (Ashmead collection.)
Habitat.—Florida: Jacksonville.
Host.—Rhynch.: *Dactylopius adonidum* Linnæus.

2. ENCYRTUS ALBITARSIS Zetterstedt.

Encyrtus albitarsis ZETTERSTEDT, Ins. Lappon., I, 1838, p. 432, female.
Comys albitarsis MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, p. 741, female.—VOLLENHOVEN, Pinacogr., 1879, p. 55, female; pl. XXXV, fig. 3.
Eucomys albitarsis DALLA TORRE, Cat. Hym., V, 1898, p. 239.

Habitat.—Europe.
Host.—Rhynch.: *Lecanium* sp.

3. ENCYRTUS BICOLOR Howard.

Comys bicolor HOWARD, Rep. U. S. Dept. Agric., 1880–81, p. 362, female and male; pl. XXIII, fig. 3.—CRESSON, Syn. Hym. N. A., 1887, p. 239.—DALLA TORRE, Cat. Hym., V, 1898, p. 239.

Type.—Cat. No. 2606, U.S.N.M.

Habitat.—United States; Canada; West Indies (Grenada).

Host.—Rhynch.: *Lecanium hesperidum* Linnæus.

4. ENCYRTUS FUSCA Howard.

Comys fusca HOWARD, Rep. U. S. Dept. Agric., 1880–81, p. 363, female and male.—CRESSON, Syn. Hym. N. A., 1887, p. 239.—DALLA TORRE, Cat. Hym., V, 1898, p. 239.

Chiloneurus maculatipennis PROVANCHER, Add. Fn. Can. Hym., 1887, p. 208, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 242.

Type.—Cat. No. 2607, U.S.N.M.

Habitat.—United States; Canada.

Host.—Rhynch.: *Lecanium* sp.

5. ENCYRTUS INFIDUS Rossi.

Chrysis infidus ROSSI, Fauna Etrusca, II, 1790, p. 80.

Chrysis? infida ILLIGER, Fauna Etrusca, 2d ed., II, 1807, p. 128.

Encyrtus infidus LATREILLE, Gen. Crus. and Ins., IV, 1809, p. 31.—SPINOLA, Ann. Mus. Hist. Nat., XVII, 1811, p. 149.

Cynipsillum infidum LAMARCK, Hist. Nat. Anim. s. Vertr., IV, 1817, p. 157.

Encyrtus infidus LEPELETIER, Encycl. Mith. Ins., X, 1825, p. 66.

Cynipsillum infidum LAMARCK, Encycl. Mith. Ins., 2d ed., IV, 1835, p. 368.

Encyrtus infidus BLANCHARD, Hist. Nat. Ins., III, 1840, p. 275.—DALLA TORRE, Cat. Hym., V, 1898, p. 259.

Pteromalus scutellatus SWEDERUS, Svensk. Vet.-Akad. Handl., XVI, 1895, p. 218.

Encyrtus scutellaris DALMAN, Svensk. Vet.-Akad. Handl., XLI, 1820, pp. 150, 370, pl. XXIII, figs. 57, 58.—CURTIS, Brit. Ent., IX, 1832, p. 395.—NEES, Hym. Ichn. Affin. Monog., II, 1834, p. 221.—WALKER, Ent. Mag., V, 1837, p. 104, female.—ZETTERSTEDT, Ins. Lappon, I, 1838, p. 432.—WESTWOOD, Intro. Mod. Class. Ins., 1840, Synop., p. 73.—RATZEBURG, Ichn. d. Forstins., I, 1844, p. 212.—KAWALL, Stettin. Ent. Zeitg., XVI, 1855, p. 231.—THOMSON, Hym. Skand., IV, 1875, p. 119, female and male.

Comys scutellata MAYR, Verh. Zool.-bot. Gesell. Wien, XXV, 1875, pp. 741, 742.

Eucomys scutellata DALLA TORRE, Cat. Hym., V, 1898, p. 240.

Habitat.—Europe; North America.

Host.—Rhynch.: *Lecanium aceris* Bouché, *L. coryli* Geoffroy.

In my collection are several varieties, or what I take to be varieties, of this species, as well as the typical form of *Encyrtus scutellatus* Swederus taken in various parts of the United States.

6. ENCYRTUS LECANIORUM Mayr.

Eucomys lecaniorum (KOLLAR) FÖRSTER, Hym. Stud., II, 1856, pp. 6–34 [s. descr.].

Comys lecaniorum MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, pp. 740, 741, female.

Eucomys lecaniorum DALLA TORRE, Cat. Hym., V, 1898, p. 239.

Habitat.—Europe; North America.

Host.—Rhynch.: *Lecanium* sp.

7. ENCYRTUS OBSCURA Dalman.

Encyrtus obscura DALMAN, Svensk. Vet.-Akad. Handl., XLI, 1820, p. 164, male.
Encyrtus scutellaris FONSCOLOMBE, Ann. Sc. Nat., XXVI, 1832, p. 304.
Encyrtus longicornis FONSCOLOMBE, Ann. Sc. Nat., XXVI, 1832, p. 305.
Encyrtus obscurus NEES, Hym. Ichn. Affin. Monogr., II, 1834, pp. 223, 434.
Encyrtus scutellaris NEES, Hym. Ichn. Affin. Monogr., II, 1834, p. 433.
Encyrtus obscurus WALKER, Ent. Mag., V, 1837, p. 105, male.
Eucomys obscurus FÖRSTER, Hym. Stud., II, 1856, p. 34.
Comys obscrura MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, pp. 741, 742, female and male.
Encyrtus obscura THOMSON, Hym. Skand., IV, 1875, p. 120, female and male.
Eucomys obscura DALLA TORRE, Cat. Hym., V, 1898, p. 239.

Habitat.—Europe.
Host.—Rhynch.: *Pulvinaria carpini* Linnæus.

8. ENCYRTUS SWEDERI Dalman.

Encyrtus swederi DALMAN, Svensk. Vet.-Akad. Handl., XLI, 1820, pp. 152, 370, female.
Encyrtus lunatus DALMAN, Svensk. Vet.-Akad. Handl., XLI, 1820, p. 156, female.
Encyrtus hirticornis DALMAN, Svensk. Vet.-Akad. Handl., XLI, 1820, p. 162.
Choreia vitis CURTIS, Guide, Arrange. Brit. Ins., 1829, p. 138.
Encyrtus vitis CURTIS, Brit. Ent., IX, 1832, p. 395, pl. CCCXCV.—HERRICH-SCHAEFFER, Faun. Ins. Germ., 1844, p. 184, pls. V, VI.
Encyrtus lunatus NEES, Hym. Ichn. Affin. Monogr., II, 1834, p. 203.—ZETTERSTEDT, Ins. Lappon, I, 1838, p. 432, female.
Encyrtus hirticornis NEES, Hym. Ichn. Affin. Monogr., II, 1834, p. 223.—BLANCHARD, Hist. Nat. Ins., III, 1840, p. 275.
Encyrtus swederi RATZEBURG, Ichn. d. Forstins., III, 1852, p. 190, female.—GOUREAU, Ann. Soc. Ent. France (4), III, 1863, Bull., p. iv.
Eucomys swederi FÖRSTER, Hym. Stud., II, 1856, p. 34.
Encyrtus swederi THOMSON, Hym. Skand., IV, 1875, p. 121, female and male.
Comys swederi MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, pp. 741, 742, female and male.—VALLENHOVEN, Pinacogr., 1879, p. 55, female and male; pl. XXXV, figs. 1, 2.
Eucomys swederi DALLA TORRE, Cat. Hym., V, 1898, p. 240.

Habitat.—Europe.
Host.—Rhynch.: *Pulvinaria vitis* Linnæus.

24. HOWARDIELLA Dalla Torre.

1897. *Howardia* DALLA TORRE, Wien. Ent. Zeitg., XVI, p. 86 (nec Targ-Tozg).
1898. *Howardiella* DALLA TORRE, Cat. Hym., V, p. 228.

(Type, *Bothriothorax peckhami* Ashmead.)

1. HOWARDIELLA PECKHAMI Ashmead.

Bothriothorax peckhami ASHMEAD, Tr. Am. Ent. Soc., XIII, 1886, p. 132, female and male.—CRESSON., Syn. Hym. N. A., 1887, p. 240.
Comys peckhami HOWARD, Proc. U. S. Nat. Mus., XVII, 1895, p. 611.
Howardia peckhami DALLA TORRE, Wien. Ent. Zeitg., XVI, 1897, p. 86.
Howardiella peckhami DALLA TORRE, Cat. Hym., V, p. 228.

Type.—Cat. No. 4735, U.S.N.M. (Ashmead collection.)
Habitat.—Wisconsin.

25. PRIONOMASTIX Mayr.

1875. *Prionomastix* MAYR, Verh. Zool.-bot. Gesell. Wien, XXV, p. 725.
1875. *Liocarus* THOMSON, Hym. Skand., IV, pp. 115, 121.

(Type, *Encyrtus morio* Dalman.)

1. PRIONOMASTIX MORIO Dalman.

Encyrtus morio DALMAN, Svensk. Vet.-Akad. Handl., XLI, 1820, p. 164, male.—NEES, Ichn. Affin. Monogr., II, 1834, p. 229, male.
Prionomastix morio MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, p. 726, male.
Liocarus morio THOMSON, Hym. Skand., IV, 1875, p. 122, male.
Prionomastix morio DALLA TORRE, Cat. Hym., V, 1898, p. 266.

Habitat.—Europe.

Tribe III. MIRINI.

26. PSILOPHRYS Mayr.

1875. *Psilophrys* MAYR, Verh. Zool.-bot. Gesell. Wien, XXV, p. 727.

(Type, *Encyrtus longicornis* Walker.)

1. PSILOPHRYS LONGICORNIS Walker.

Encyrtus longicornis WALKER, Ann. and Mag. Nat. Hist., XIX, 1847, p. 229, female.
Psilophrys longicornis MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, p. 728, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 253.

Habitat.—Europe.
Host.—Rhynch.: *Lecanium* sp.

2. PSILOPHRYS ARMATA Ashmead.

Psilophrys armatus ASHMEAD, Ent. Am., IV, 1888, p. 16, female and male.
Psilophrys armata DALLA TORRE, Cat. Hym., V, 1898, p. 253.

Type.—Cat. No. 4736, U.S.N.M. (Ashmead collection.)
Habitat.—Florida; Colorado.

3. PSILOPHRYS PALLIDIPES Ashmead.

Psilophrys pallipes ASHMEAD, Bull. No. 3, Kans. Exp. Sta., 1888, Append., V, p. 1, female.

Type.—Cat. No. 4737, U.S.N.M. (Ashmead collection.)
Habitat.—Kansas: Manhattan.

27. PARAPSILOPHRYS Howard.

1898. *Parapsilophrys* HOWARD, Proc. U. S. Nat. Mus., XXI, p. 232.

(Type, *Parapsilophrys gelechiæ* Howard.)

1. PARAPSILOPHRYS GELECHIÆ Howard.

Parapsilophrys gelechiæ Howard, Proc. U. S. Nat. Mus., XXI, 1898, p. 232, female and male.

Type.—Cat. No. 5023, U.S.N.M.
Habitat.—Wyoming: Jetsam.
Host.—Lepid.: *Gelechia*, sp. on cottonwood.

28. LIOTHORAX Mayr.

1875. *Liothorax* MAYR, Verh. Zool.-bot. Ges. Wien, XXV, p. 728.

(Type, *Encyrtus glaphyra* Walker.)

1. LIOTHORAX GLAPHYRA Walker.

Encyrtus glaphyra WALKER, Ent. Mag., IV, 1837, p. 454, male.
Liothorax glaphyra MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1895, p. 729, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 54.

Habitat.—Europe.

2. LIOTHORAX MELANOCERA Ashmead, new species.

Female.—Length, 1.6 mm. Head, thorax, except above, and the mesopleura and abdomon æneous black; mesopleura bluish; mesonotum and scutellum metallic green or cuperous, recticulates; head anteriorly and on cheeks metallic; antennæ long black; the scape long and slender, the pedicel fully thrice as long as thick, obconical, flagelium subclavate, but slender, gently thickening toward club. Wings hyaline. Ovipositor slender, exserted fully one-half the length of abdomen. Legs vary from an æneous black to a metallic brown-black, with the knees and the anterior and middle tarsi pale yellowish.

Type.—Cat. No. 4738, U.S.N.M. (Ashmead collection.)

Habitat.—District of Columbia.

29. LITOMASTIX Thomson.

1875. *Litomastix* THOMSON, Hym Skand., IV, p. 171.

(Type, *Encyrtus chalconotus* Dalman.)

1. LITOMASTIX ANNELLUS Thomson.

Litomastix annellus THOMSON, Hym. Skand., IV, 1875, p. 181, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 244.

Habitat.—Europe: Sweden.

2. LITOMASTIX AURICOLLIS Thomson.

Litomastix auricollis THOMSON, Hym. Skand., IV, 1875, p. 175, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 245.

Habitat.—Europe: Sweden.

3. LITOMASTIX CHALCONOTUS Dalman.

Encyrtus chalconotus DALMAN, Svensk. Vet. -Akad. Handl., XLI, 1820, p. 169, pl. VIII, fig. 61.—NEES, Hym. Ichn. Affin. Monog., II, 1834, pp. 232, 434.
Encyrtus scriconis DALMAN, Hym. Ichn. Affin. Menog., II, 1820, p. 360, male.—NEES, Hym. Ichn. Affin. Menog., II, 1834, p. 244.—WALKER, Ent. Mag., IV, 1837, p. 26, male.
Encyrtus mitrens WALKER, Ent. Mag., IV, 1839, p. 35, female.
Copidosoma chalconotus MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, pp. 734, 735, 739.
Litomastix chalconotus THOMSON, Hym. Skand., IV, 1875, p. 173, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 245.

Habitat.—Europe.

Host.—Lepid.: *Depressaria nervosa* Haworth, *Eupithecia succenturiata* Linnæus, *E. pimpinellata* Hübner, *E. oblongata* Thunburg, *E. lariciata* Freyer, *Geometra galiaria* Hübner, *G. rubidaria* Fabricius, *G. sinuaria* Hübner, and *Tortrix* sp.

4. LITOMASTIX DIVERSICORNIS Howard.

Copidosoma diversicornis HOWARD, Journ. Linn. Soc. Lond. Zool., XXV, 1894, p. 92, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 243.

Type.—Cat. No. 2719, U.S.N.M.; also in British Museum.

Habitat.—West Indies: St. Vincent.

5. LITOMASTIX FILICORNIS Dalman.

Encyrtus filicornis DALMAN, Svensk. Vet.-Akad. Handl., XLI, 1820, p. 351, female.—NEES, Hym. Ichn. Affin. Monog., II, 1834, p. 241, female.

Encyrtus didius WALKER, Ent. Mag., IV, 1837, p. 452, female.

Copidosoma? filicornis FÖRSTER, Hym. Stud., II, 1856, p. 38.

Copidosoma filicorne MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, pp. 734, 735, 737, female and male.

Litomastix filicornis THOMSON, Hym. Skand., IV, 1875, p. 180, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 245.

Habitat.—Europe.

Host.—Lepid.: *Lita alsinella* Zeller.

6. LITOMASTIX FLAGELLARIS Dalman.

Encyrtus flagellaris DALMAN, Svensk. Vet.-Akad. Handl., XLI, 1820, p. 350, female.—NEES, Hym. Ichn. Affin. Monogr., II, 1834, p. 240, female.

Encyrtus anceus WALKER, Ent. Mag., IV, 1837, p. 452.

Encyrtus tegularis RATZEBURG, Ichn. d. Forstins., III, 1852, p. 190.

Copidosoma flagellaris FÖRSTER, Hym. Stud., II, 1856, p. 38.

Copidosoma? anceus FÖRSTER, Hym. Stud., II, 1856, p. 38.

Copidosoma flagellare MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, pp. 734, 737.—WACHTL, Wien. Ent. Zeit., I, 1882, p. 297, female.

Litomastix flagellaris THOMSON, Hym. Skand., IV, 1875, p. 179, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 245.

Habitat.—Europe.

Host.—Lepid.: *Cerostoma radiatella* Donovan.

7. LITOMASTIX FUSCISQUAMA Thomson.

Litomastix fuscisquama THOMSON, Hym. Skand., IV, 1875, p. 177, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 245.

Habitat.—Europe: Sweden.

8. LITOMASTIX GENALIS Thomson.

Litomastix genalis THOMSON, Hym. Skand., IV, 1875, p. 178, female and male.—DALLA TORRE, Cat. Hym., IV, 1898, p. 245.

Habitat.—Europe: Sweden.

9. LITOMASTIX LATIFRONS Thomson.

Litomastix latifrons THOMSON, Hym. Skand., IV, 1875, p. 175, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 245.

Habitat.—Europe: Sweden.

10. LITOMASTIX PHALAENARUM Thomson.

Litomastix phalaenarum THOMSON, Hym. Skand., IV, 1875, p. 175, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 245.

Habitat.—Europe: Sweden.

11. LITOMASTIX STYLATA Thomson.

Litomastix stylata THOMSON, Hym. Skand., IV, 1875, p. 180, male.—DALLA TORRE, Cat. Hym., V, 1898, p. 245.

Habitat.—Europe: Sweden.

12. LITOMASTIX TRIANGULARIS Thomson.

Litomastix triangularis THOMSON, Hym. Skand., IV, 1875, p. 177, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 246.

Habitat.—Europe: Sweden.

13. LITOMASTIX TRUNCATULA Thomson.

Litomastix truncatula THOMSON, Hym. Skand., IV, 1875, p. 173, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 246.

Habitat.—Europe: Sweden.

14. LITOMASTIX UNGULARIS Thomson.

Litomastix ungularis THOMSON, Hym. Skand., IV, 1875, p. 176, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 246.

Habitat.—Europe: Sweden.

30. BERECYNTUS Howard.

1898. *Berecyntus* HOWARD, Proc. U. S. Nat. Mus., XXI, p. 238.

(Type, *Berecyntus bakeri* Howard.)

1. BERECYNTUS BAKERI Howard.

Berecyntus bakeri HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, p. 238, female.

Type.—Cat. No. 5030, U.S.N.M.

Habitat.—Colorado.

2. BERECYNTUS FLORIDANUS Ashmead, new species.

Female.—Length, 0.08 mm. Head and thorax above metallic or bronzy green, the thorax on sides and beneath dark blue-black, the head above more or less purplish, legs black or brown-black, the knees, tips of tibiæ, and tarsi, except terminal joint, honey-yellow, the middle tibial spur and middle tarsi whitish. Antennæ brown-black, its pedicel at tip piceous; flagellum clavate, sparsely hairy, not longer than the scape; the funicle joints all short, wider than long, and gradually widening to the club, the latter rather large half the length of the funicle. Wings hyaline, the veins blackish, the marginal vein a little longer than thick, the stigmal vein scarcely longer but much slenderer, the postmarginal vein wanting or only slightly developed.

Type.—Cat. No. 4850, U.S.N.M. (Ashmead collection.)

Habitat.—Florida: Biscayne Bay. Mrs. Annie T. Slosson.

31. COPIDOSOMA Ratzeburg.

1844. *Copidosoma* RATZEBURG, Ichn. d. Forstins., I, p. 157.

(Type, *Copidosoma boucheanum* Ratzeburg.)

1. COPIDOSOMA CELAENÆ Howard.

Copidosoma celaenæ HOWARD, Bull. No. 5, U. S. Dept. Agric., Div. Ent., 1885, p. 11, female and male.—CRESSON, Syn. Hym. N. A., 1887, p. 239.—DALLA TORRE, Cat. Hym., V, 1898, p. 242.

Type.—Cat. No. 2630, U.S.N.M.

Habitat.—Missouri; Ohio.

Host.—Lepid.: *Celaena renigera.*

2. COPIDOSOMA GELECHIÆ Howard.

Copidosoma gelechiæ HOWARD, Bull. No. 5, U. S. Dept. Agric., Div. Ent., 1885, p. 10, female and male.—CRESSON, Syn. Hym. N. A., 1887, p. 239.—DALLA TORRE, Cat. Hym., V, 1898, p. 243.

Type.—Cat. No. 2628, U.S.N.M.

Habitat.—District of Columbia.

Host.—Lepid.: *Gelechia gallæ-solidaginis* Riley.

3. COPIDOSOMA INTERMEDIUM Howard.

Copidosoma intermedium HOWARD, Bull. No. 5, U. S. Dept. Agric., Div. Ent., 1885, p. 12, female and male.—CRESSON, Syn. Hym. N. A., 1887, p. 239.—DALLA TORRE, Cat. Hym., V, 1898, p. 243.

Type.—Cat. No. 2631, U.S.N.M.

Habitat.—New Jersey; Missouri.

Host.—Lepid.: *Gelechia gallæ-asterella* Kellicott.

4. COPIDOSOMA PYRALIDIS Ashmead.

Encyrtus pyralidis ASHMEAD, Ent. Amer., IV, 1888, p. 15, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 262.

Copidosoma variegatum HOWARD, Ins. Life, I, 1888, p. 197, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 243.

Type.—Cat. No. 1478, U.S.N.M. (*variegatum* Howard).

Type.—Cat. No. 4739, U.S.N.M. (*pyralidis* Ashmead). (Ashmead collection.)

Habitat.—Maryland; District of Columbia.

Host.—Lepid.: *Anarsia lineatella* Zeller.

5. COPIDOSOMA TRUNCATELLUM Dalman.

Encyrtus truncatellum DALMAN, Svensk. Vet.-Akad. Handl., XLI, 1820, p. 168.

Cynips agrotis FONSCOLOMBE, Sun. Sc. Nat., XXVI, 1832, p. 295.

Encyrtus truncatellus NEES, Hym. Ichn. Affin. Monogr., II, 1834, p. 232.

Encyrtus atheas WALKER, Ent. Mag., V, 1837, p. 37, female.

Encyrtus truncatellus WALKER, Ent. Mag., p. 38.—RATZEBURG, Ichn. d. Forstins., I, 1844, p. 213; III, 1852, p. 190.

Copidosoma truncatellum MAYR, Verh. Zool.-bot. Gesell. Wien, XXV, pp. 734, 739, female.—FITCH, Trans. Ent. Soc. Lond., 1881, Proc., p. xxi.—RILEY, Rep. U. S. Entom. Com., 1883, p. 131, pl. XI, fig. 4.

(?) *Litomastix truncatellus* THOMSON, Hym. Skand., IV, 1875, p. 174, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 246.

Habitat.—Europe; North America.

Host.—Lepid.: *Zeuzera aesculi* Linnæus, *Thera variata* Schiff, *Agrotis fumosa* Hübner, *Hadena polyodon* Linnæus, *Leucania albipuncta* Fabricius, *Plusia concha* Fabricius, *P. deaurata* Esper, *P. moneta* Fabricius, *P. festucæ* Linnæus, *P. jota* Linnæus, *Catocala electa* Borkhausen, *Eupithecia absynthiata* Clerck.

6. COPIDOSOMA TURNI Packard.

Encyrtus turni PACKARD, Proc. Bost. Soc. Nat. Hist., XXI, 1881, p. 32, female and male.—CRESSON, Syn. Hym. N. A., 1857, p. 239.

Copidosoma turni HOWARD, Scudders' Butterflies, East. U. S., 1889, p. 1888, female and male; pl. LXXXIX, fig. 5.—DALLA TORRE, Cat. Hym., V, p. 243.

Habitat.—New Hampshire.

Host.—Lepid.: *Papilio turnus* Linnæus, *Jasoniades glaucus* Linnæus.

7. COPIDOSOMA VAGUM Howard.

Copidosoma vagum HOWARD, Bull. No. 5, U. S. Dept. Agric., Div. Ent., 1885, p. 11, female and male.—CRESSON, Syn. Hym. N. A., 1887, p. 239.—DALLA TORRE, Cat. Hym., V, 1898, p. 243.

Type.—Cat. No. 2629, U.S.N.M.

Habitat.—Missouri.

Host.—Lepid.: *Gelechia pseudacaciella* Chambers.

32. PRIONOMITUS Mayr.

1875. *Prionomitus* MAYR, Verh. Zool.-bot. Ges. Wien, XXV, p. 701.

(Type, *Encyrtus mitratus* Dalman.)

1. PRIONOMITUS MITRATUS Dalman.

Encyrtus mitratus DALMAN, Svensk. Vet.-Akad. Handl., XLI, 1820, p. 352, female.

Encyrtus chlorinus DALMAN, Svensk. Vet.-Akad. Handl., XLI, 1820, p. 361, male.

Encyrtus mitratus NEES, Ichn. affin. Monogr., II, 1834, p. 242.

Encyrtus chlorinus NEES, Ichn. affin. Monogr., II, 1834, p. 248.

Encyrtus mitratus MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, pp. 710, 721, female.

Prionomitus chlorinus MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, p. 701, male.

Microterys mitratus THOMSON, Hym. Skand., IV, 1875, p. 162, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 235.

Habitat.—Europe.

2. PRIONOMITUS TILIARIS Dalman.

Encyrtus tiliaris DALMAN, Svensk. Vet.-Akad. Handl., XLI, 1820, p. 171.—NEES, Hym. affin. Monogr., II, 1834, p. 235.

Encyrtus conifer WALKER, Ent. Mag., IV, 1837, p. 461, female and male.

Encyrtus liliaris MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, pp. 711, 722, female.

Microterys tiliaris THOMSON, Hym. Skand., IV, 1875, p. 163.—DALLA TORRE, Cat. Hym., V, 1898, p. 236.

Habitat.—Europe; North America.

33. ARCHINUS Howard.

1896. *Archinus* HOWARD, Journ. Linn. Soc. Lond., XXVI, p. 155.

(Type, *Archinus occupatus* Howard.)

1. ARCHINUS OCCUPATUS Howard.

Archinus occupatus HOWARD, Journ. Linn. Soc. Lond. Zool., XXVI, 1896, p. 155, female.

Type in British Museum.

Habitat.—West Indies: Grenada.

34. PARENCYRTUS Ashmead, new genus.

(Type, *Parencyrtus brasiliensis* Ashmead.)

Allied to *Epiencyrtus* (*Encyrtus* Mayr and others), but the outer tooth of the mandibles is long, acute; the eyes large, oval, and very hairy; the flagellum long, pilose, the pedicel being fully three times as long as thick, subcylindrical, the first joint of the funicle very long, longer than the pedicel; the marginal vein is as long or almost as long as the stigmal, while the postmarginal vein is much longer than the marginal.

1. PARENCYRTUS BRASILIENSIS Ashmead, new species.

Female.—Length, 1.6 mm.; to tip of wings, 2 mm. Blue; mesopleura and coxæ æneous black; scutellum and ridge of the metapleura with a strong metallic tinge; abdomen æneous; scape, club of antennæ, and legs, brownish yellow; the pedicel and funicle brown; the extreme base of anterior and middle femora blackish or dusky; wings subfuscous.

The head has a few sparse punctures on the forehead and a row along the inner margin of the eyes. The antennæ are inserted rather close to the mouth border and widely apart, with a prominent ridge between. The mesonotum is smooth impunctured, as long as the scutellum. The latter, except the axillæ, being shagreened, strongly metallic, and contrasts greatly with the smooth, blue surface of the mesonotum. Metanotum very short, the pleura bare, bronzed green. Abdomen subtriangular, depressed, shorter than the thorax.

Habitat.—Brazil: Chapada. September. (H. H. Smith collection.)

35. MIRA Schellenberg.

1803. *Mira* SCHELLENBERG, Genres des mouch. Dipt., p. 68.
1809. *Encyrtus* LATREILLE (part), Gen. Crus. et Ins., IV, p. 31.
1855. *Dicellocerus* MENZEL, Stettin. Ent. Zeitg., XVI, p. 270.
1856. *Euryscapus* FÖRSTER, Hym. Stud., II, p. 32.
1857. *Lonchocerus* DAHLBOM, Öfvers. Svensk. Vet.-Akad. Förh., XIV, p. 293.

(Type, *Mira macrocera* Schellenberg.)

1. MIRA MACROCERA Schellenberg.

Mira macrocera SCHELLENBERG, Genres des mouch. Dipt., 1803, pp. 68, 69.
Mira mucora SCHELLENBERG, Genres des mouch. Dipt., pl. XIV.
Encyrtus macrocera LATREILLE, Gen. Crus. et Ins., IV, 1809, p. 31.

Encyrtus platycerus DALMAN, Svensk. Vet.-Akad. Handl., XLI, 1820, p. 566.—NEES, Ichn. affin. Monogr., II, 1834, p. 254.

Dicellocerus vibrans MENZEL, Stettin. Ent. Zeitg., XVI, 1855, pp. 270–274, pl. 1.

Euryscapus platycerus FÖRSTER, Hym. Stud., II, 1856, p. 35.

Encyrtus vibrans RUTHE, Stettin. Ent. Zeitg., XVII, 1856, p. 46.

Mira macrocera FÖRSTER, Verh. d. naturh. Ver. pr. Rheinl., XVII, 1860, p. 135, female and male.

Lonchocerus platycerus THOMSON, Hym. Skand., IV, 1875, p. 130, female.

Mira macrocera MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, p. 771, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 237.

Habitat.—Europe.

2. MIRA SALTATOR Lindeman.

Euryscapus saltator LINDEMAN, Bull. Soc. Natural. Moscou (2), I, 1887, p. 190, female and male.

Mira saltator DALLA TORRE, Cat. Hym., V, 1898, p. 238.

Habitat.—Europe: Russia.

36. SPHÆROPISTHUS Thomson.

1875. *Sphæropisthus* THOMSON, Hym. Skand., IV, pp. 116, 131.

(Type, *Sphæropisthus pascuorum* Thomson.)

1. SPHÆROPISTHUS PASCUORUM Thomson.

Sphæropisthus pascuorum THOMSON, Hym. Skand., IV, 1875, p. 132, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 238.

Habitat.—Europe: Sweden.

2. SPHÆROPISTHUS ANNULICORNIS Ashmead, new species.

Male.—Length, 1.6 mm. Head and thorax above aeneous green; scutellum orange-red; prothorax at sides and beneath, mesopleura, pectus and legs, ferruginous; abdomen aeneous black, with rigid hairs especially toward apex; antennæ long, the scape long, slender, subclavate, with the pedicel pale ferruginous; flagellum subclavate, gradually thickened toward apex, subcompressed, clothed with a short dense pubescence, black, with joints 4, 5, and 6 snow white. Head punctate, as seen from in front elongate, about twice as long as wide, as seen from above semiglobose, the eyes slightly convergent above, the vertex narrower than the face anteriorly; hind ocelli rather close together, the front ocellus being more than twice as far from the hind ocelli than the space between them. Metapleura clothed with a rather dense silvery pubescence. Wings hyaline, with a discal cloud beneath the marginal vein and an acuate band just before the apex.

Type.—Cat. No. 4848, U.S.N.M. (Ashmead collection.)

Habitat.—Florida: Jacksonville.

3. SPHÆROPISTHUS AURICEPS Ashmead, new species.

Female.—Length, 1.3 mm. Ground color pale ferruginous, the head on vertex and anteriorly to scrobes gold-green, mesonotum and scutellum green with a bluish sheen; legs ferruginous, the middle tibiæ

dark fuscous, their tarsi white; wings hyaline with a large fuscous cloud beneath the marginal vein; abdomen yellowish at basal third, aeneous black beyond and ending in a slender ovipositor which is about one-half the length of the abdomen. (Antennæ broken off.)

Type.—Cat. No. 4849, U.S.N.M. (Ashmead collection.)

Habitat.—Florida: Fort George Island.

37. CHESTOMORPHA Ashmead, new genus.

(Type, *Chestomorpha biformis* Ashmead.)

Head and thorax similar to *Aphycus*, the frons broad, convex, the ocelli arranged in a triangle, the lateral ocelli as far from the eye margin as to the front ocellus. Eyes oval, bare, a little longer than the malar space. Mandibles tridentate. Scutellum much longer than the pronotum, the latter short, abrupt anteriorly. Front wings in male clear hyaline, in female with a substigmal blotch or fascia; the marginal vein is very short, the stigmal vein fully twice as long as the marginal or longer, while the postmarginal is well developed, considerably longer than the stigmal. Antennæ 11-jointed, the flagellum in female subclavate, the funicle joints, or at least joints 3 to 6, wider than long; in male the flagellum is filiform, stout, the joints nearly thrice as long as thick.

1. CHESTOMORPHA BIFORMIS Ashmead, new species.

Female.—Length, 1.8 mm. Ferruginous; eyes, ocelli, flagellum, metanotum more or less, a large spot on dorsum of abdomen, and the middle and hind tarsi, black. Wings hyaline, the front pair with a fuscous discoidal blotch or band beneath the marginal and stigmal veins.

The male differs from the female in being much more robust and almost entirely black; scape brown; front legs with apices of their femora, tibiæ and tarsi, honey-yellow; middle tibial spurs and first joint of tarsi, white; tegulæ, pale. Wings hyaline, without a discoidal blotch, the marginal and stigmal veins brown.

Type.—Cat. No. 4740, U.S.N.M. (Ashmead collection.)

Habitat.—New Mexico: Las Cruces. (T. D. A. Cockerell.)

38. ÆNASIUS Walker.

1846. *Enasius* WALKER, Ann. and Mag. Nat. Hist., XVII, p. 180.

(Type, *Enasius hyettus* Walker.)

1. ÆNASIUS HYETTUS Walker.

Encyrtus (*Enasius*) *hyettus* WALKER, Ann. and Mag. Nat. Hist., XVII, 1846, p. 181, female.

Enasius hyettus HOWARD, Journ. Linn. Soc. Lond. Zool., XXV, 1894, p. 89, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 229.

Habitat.—West Indies: Grenada, St. Vincent.

2. ÆNASIUS CHAPADÆ Ashmead, new species.

Female.—Length, 1 mm. Robust, short and broad, very little longer than wide. Head blue, thorax above blue-black, beneath æneous black; abdomen metallic æneous; scape within and at tip, and the funicle pale brown, rest of scape and the club brown-black; legs dark brown, the tarsi light brown or yellowish; wings subfuscous.

The head is covered with a close, thimble-like punctuation, clear to the scrobes, which are short; the eyes are large, long-oval, and pubescent; the scape has the characteristic leaf-like expansion beneath; the funicle is short, the joints, except possibly the first, which is small and moniliform, are wider than long and increase in width to the club, the latter being very large and as long as the funicle and very much thicker. The thorax is similar to that in *A. hyettus* Walker, except that mesonotum has the thimble-like punctuation similar to that of the head, only less distinctly impressed; the scutellum is large, about twice as long as the mesonotum, with the punctuation almost obsolete.

Habitat.—Brazil: Chapada. (H. H. Smith collection.)

39. CHALCASPIS Howard.

1895. *Chalcaspis* HOWARD, Proc. U. S. Nat. Mus., XVII, p. 606.

(Type, *Chalcaspis pergandei* Howard.)

1. CHALCASPIS PERGANDEI Howard.

Chalcaspis pergandei HOWARD, Proc. U. S. Nat. Mus., XVII, 1895, p. 605.—DALLA TORRE, Cat. Hym., V, 1898, p. 227.

Type.—Cat. No. 2692, U.S.N.M.

Habitat.—District of Columbia.

40. BOTHRIOTHORAX Ratzeburg.

1844. *Bothriothorax* RATZEBURG, Ichn. d. Forstins., I, p. 209.
1856. *Sceptrophorus* FÖRSTER (part), Hym. Stud., II, p. 34, male.
1857. *Trimorphocerus* DAHLBOM, Öfvers. Svensk. Vet.-Akad. Förh., XIV, p. 292.

(Type, *Encyrtus claricornis* Dalman.)

1. BOTHRIOTHORAX CALIFORNICUS Howard.

Bothriothorax californicus HOWARD, Proc. U. S. Nat. Mus., XVII, 1895, p. 609, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 227.

Type.—Cat. No. 2694, U.S.N.M.

Habitat.—California.

Host.—Dipt.: *Catabomba pyrastri* Linnæus.

2. BOTHRIOTHORAX INSULARIS Howard.

Bothriothorax insularis HOWARD, Journ. Linn. Soc. Lond. Zool., XXVI, 1896, p. 147, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 228.

Type in British Museum.

Habitat.—West Indies: Grenada.

3. BOTHRIOTHORAX MACROGLENES Ashmead.

Bothriothorax macroglenes ASHMEAD, Bull. No. 3, Kans. Exp. Sta., 1888, App., p. v.

Type in Kansas State Agricultural College.

Habitat.—Kansas: Riley County.

4. BOTHRIOTHORAX NIGRIPES Howard.

Bothriothorax nigripes HOWARD, Proc. U. S. Nat. Mus., XVII, 1895, p. 610, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 228.

Type.—Cat. No. 2695, U.S.N.M.

Habitat.—California; New Mexico.

5. BOTHRIOTHORAX NOVEBORACENSIS Howard.

Bothriothorax noveboracensis HOWARD, Proc. U. S. Nat. Mus., XVII, 1895, p. 609, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 228.

Type.—Cat. No. 2693, U.S.N.M.

Habitat.—New York; New Hampshire.

6. BOTHRIOTHORAX PECULIARIS Howard.

Bothriothorax peculiaris HOWARD, Bull. No. 5, U. S. Dept. Agric., Div. Ent., 1885, p. 20, female and male.—CRESSON, Syn. Hym. N. A., 1887, p. 240.—HOWARD, Proc. U. S. Nat. Mus., XVII, 1895, p. 608.—DALLA TORRE, Cat. Hym., V, 1898, p. 228.

Type.—Cat. No. 2646, U.S.N.M.

Habitat.—Virginia.

Host.—Dipt.: Syrphid larva.

7. BOTHRIOTHORAX PLANIFRONS Howard.

Bothriothorax planifrons HOWARD, Proc. U. S. Nat. Mus., XVII, 1895, p. 611, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 228.

Type.—Cat. No. 2697, U.S.N.M.

Habitat.—California.

8. BOTHRIOTHORAX ROTUNDIFORMIS Howard.

Bothriothorax rotundiformis HOWARD, Proc. U. S. Nat. Mus., XVII, 1895, p. 610, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 228.

Type.—Cat. No. 2696, U.S.N.M.

Habitat—California.

9. BOTHRIOTHORAX VIRGINIENSIS Howard.

Bothriothorax virginiensis HOWARD, Bull. No. 5, U. S. Dept. Agric., Div. Ent., 1885, p. 20, female.—CRESSON, Syn. Hym. N. A., 1887, p. 240.—HOWARD, Proc. U. S. Nat. Mus., XVII, 1895, p. 608, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 228.

Type.—Cat. No. 2645, U.S.N.M.

Habitat.—Virginia.

41. ARATUS Howard.

1896. *Aratus* HOWARD, Journ. Linn. Soc. Lond. Zool., XXVI, p. 155.

(Type, *Aratus scutellatus* Howard.)

1. ARATUS SCUTELLATUS Howard.

Aratus scutellatus HOWARD, Journ. Linn. Soc. Lond. Zool., XXVI, 1896, p. 639, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 266.

Type.—Cat. No. 3257, U.S.N.M.
Habitat.—West Indies: Grenada.

42. PENTELICUS Howard.

1895. *Pentelicus* HOWARD, Proc. U. S. Nat. Mus., XVII, p. 611.

(Type, *Pentelicus aldrichii* Howard.)

1. PENTELICUS ALDRICHII Howard.

Pentelicus aldrichii HOWARD, Proc. U. S. Nat. Mus., XVII, 1895, p. 612, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 227.

Type.—Cat. No. 2698, U.S.N.M.
Habitat.—Dakota.

43. BLEPYRUS Howard.

1898. *Blepyrus* HOWARD, Proc. U. S. Nat. Mus., XXI, p. 234.

(Type, *Blepyrus mexicanus* Howard.)

1. BLEPYRUS MEXICANUS Howard.

Blepyrus mexicanus HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, p. 234, female and male.

Type.—Cat. No. 5024, U.S.N.M.
Habitat.—Mexico: Monterey.
Host.—Rhynch.: *Pseudococcus yuccæ* Coquillett.

2. BLEPYRUS MARSDENI Howard.

Blepyrus marsdeni HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, p. 234, female.

Type.—Cat. No. 5025, U.S.N.M.
Habitat.—Hawaiian Islands: Honolulu.

3. BLEPYRUS TEXANUS Howard.

Blepyrus texanus HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, p. 235, female.

Type.—Cat. No. 5026, U.S.N.M.
Habitat.—Texas: Brownsville.
Host.—Rhynch.: *Dactylopius virgatus* Cockerell.

44. HEMÆNASIUS Ashmead, new genus.

(Type, *Hemænasius confusus* Ashmead.)

Aspect of *Ænasius* Walker and *Euryrhopalus* Howard, but quite distinct from both in sculpture and in following characters: From *Ænasius* it differs in punctuation, in the much longer scape and flagellum, the former being only slightly dilated, the longer mesonotum and in venation; from *Euryrhopalus* in the broader vertex, antennal characters, and in the quite different venation, brought out in my table.

1. HEMÆNASIUS CONFUSUS Ashmead, new species.

Female.—Length, 1 mm. Robust, black, the head anteriorly from the front ocellus blue; flagellum brown-black, the scape at base and apex yellowish; funicle joints 4 and 6 whitish; tips of tibiæ and tarsi, except last joint, honey-yellow; wings hyaline, dusky or fuliginous at base only, the marginal vein punctiform, the postmarginal vein developed but slender, about two-thirds the length of the sigmal; all veins brown. The head on vertex has some small scattered punctures but anteriorly it is perfectly smooth and polished; the thorax is almost smooth, but with a strong lens one can detect some delicate transverse striæ and a few microscopic punctures; abdomen short, broadly oval, smooth and shining.

Type.—Cat. No. 4851, U.S.N.M. (Ashmead collection.)

Habitat.—District of Columbia: Washington.

45. EURYRHOPALUS Howard.

1898. *Euryrhopalus* HOWARD, Proc. U. S. Nat. Mus., XXI, p. 237.

(Type, *Euryrhopalus schwarzi* Howard.)

1. EURYRHOPALUS SCHWARZI Howard.

Euryrhopalus schwarzi HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, p. 237, female.

Type.—Cat. No. 5029, U.S.N.M.

Habitat.—Florida: Biscayne Bay.

46. HEMENCYRTUS Ashmead, new genus.

(Type, *Hemencyrtus herbertii* Ashmead.)

Stature and general appearance of *Encyrtus cecidomyiæ* Howard, but quite different in sculpture and in venational and antennal characteris tics. The head is scarcely as wide as the thorax between the wings, lenticular, shagreened, but with sparse, distinct, umbilicate punctures on the forehead. The antennæ are 11-jointed, filiform or nearly, and clothed with short, sparse hairs, the joints of the funicle all being a little longer than wide; the club is rather short, scarcely as long as the pedicel and first joint of funicle united, the pedicel being obconical and hardly twice as long as thick.

The pronotum is distinct, not short, about two-thirds the length of the mesonotum, the latter being twice as wide as long and somewhat shorter than the scutellum. The front wings have a short marginal vein which is only about twice as long as thick, or a little longer; the stigmal vein is nearly twice as long as the marginal, while the postmarginal vein is very much longer than the stigmal. Abdomen in female conically pointed, somewhat longer than the head and thorax united, with the ovipositor exserted, the sheaths being very broad.

1. HEMENCYRTUS HERBERTII Ashmead, new species.

Female.—Length, 2.8 mm. Dark blue; collar, scutellum toward apex, metapleura, and abdomen aeneous black; antennæ, except three or four apical joints, and the legs, except the coxæ, brownish-yellow. Head with sparse but distinct thimble-like punctures on forehead and along the inner orbits; the scrobes form a distinct semicircular depression. The mesonotum is smooth apparently, but with a strong lens one can detect a vaguely defined or indistinctly impressed thimble-like punctuation. Wings subhyaline; tegulæ piceous, the subcostal vein yellowish, while the marginal, stigmal, and postmarginal veins are brown. Abdomen a little longer than the head and thorax united, depressed or concave above, carinate beneath; the ovipositor exserted to nearly one-third its length, with very broad, compressed sheaths.

Habitat.—Brazil: Chapada. (Herbert H. Smith collection.)

47. COCCOPHOCTONUS Ashmead, new genus.

(Type, *Coccophoctonus dactylopii* Ashmead.)

Form very broad and robust, resembling somewhat the genus *Phænodiscus* Förster. The head is lenticular, wider than the thorax, with very large oblong-oval eyes, the frons in consequence being rather narrow but still with the thimble-like punctuation. The antennæ are very short, the flagellum being scarcely longer than the slender scape, the club very large and distinctly longer than the short funicle, the joints of the latter being very small, transverse or annular. The pronotum is short; the mesonotum fully twice as wide as long, shorter than the scutellum and smooth or very indistinctly punctate. The wings, unlike those in *Phænodiscus*, are hyaline, the marginal vein being scarcely three times as long as thick, the stigmal vein longer than the marginal, while the postmarginal vein is fully as long as the marginal and stigmal veins united. The abdomen in outline is triangular, broadly sessile, depressed, and much shorter than the thorax.

The male resembles the female, but is much smaller, narrower, less robust, with the head smaller and not broader than the thorax; otherwise in antennal and venational characters it agrees with the female.

1. COCCOPHOCTONUS DACTYLOPII Ashmead, new species.

Female.—Length, 1.4 mm. Robust, blue-black, the abdomen aeneous; scape pale yellowish; all tibiæ and tarsi, apical third of middle tibiæ,

and the apical half, or a little more, of the hind femora, honey-yellow. The middle tibiæ are sometimes dusky toward base. Frons with a rather close thimble-like punctuation; mesonotum nearly smooth, but with a sparsely, vaguely defined punctuation; scutellum shagreened.

Male.—Length, 0.9 mm. Differs from female in being much smaller, narrower, and less robust; the legs are brown-black, with tips of femora and the tibiæ and tarsi honey-yellow, while the anterior and middle tibiæ are more or less dusky or fuscous basally.

Type.—Cat. No. 5081, U.S.N.M.

Habitat.—Australia.

Host.—Rhynch.: *Dactylopius* sp.

Described from 11 specimens, bred from a Coccid, *Dactylopius* sp., September, 1894, by Albert Koebele.

48. PHÆNODISCUS Förster.

1856. *Phænodiscus* FÖRSTER, Hym. Stud., II, p. 144.
1856. *Discodes* FÖRSTER, Hym. Stud., II, p. 32.

(Type, *Encyrtus anens* Dalman.)

1. PHÆNODISCUS ARIZONENSIS Howard.

Phænodiscus arizonensis HOWARD, Proc. U. S. Nat. Mus,, XXI, 1898, p. 248, female.

Type.—Cat. No. 3853, U.S.N.M.

Habitat.—Arizona: Chiricahua Mountains; Colorado (Gillette); New Mexico (Cockerell).

2. PHÆNODISCUS CONFORMIS Howard.

Encyrtus conformis HOWARD, Journ. Linn. Soc. Lond. Zool., XXVI, 1896, p. 152, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 256.

Type.—Cat. No. 4852, U.S.N.M.; also in British Museum.

Habitat.—West Indies: Grenada.

3. PHÆNODISCUS UNICOLOR Ashmead.

Aphycus unicolor ASHMEAD, Ent. Amer., IV, 1898, p. 15, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 252.

Female.—Length, 1.2 mm. Uniformly pale ferruginous, the tarsi yellowish, the funicle joints 4, 5, and 6 snow white, the club black, wings somewhat abbreviated, brownish. The head has the coarse, characteristic thimble-like punctuation, while the mesonotum and scutellum are smooth, impunctate.

Type.—Cat. No. 4741, U.S.N.M. (Ashmead collection.)

Habitat.—Florida: Jacksonville.

Allied to *P. arizonensis* Howard, but smaller, paler, and readily distinguished by the color of the coxæ and the abbreviated wings.

49. RHYTIDOTHORAX Ashmead, new genus.

(Type, *Rhytidothorax marlatti* Ashmead.)

Allied to *Phænodiscus* Förster, but much less robust and with the following structural differences: The wings are hyaline, the marginal vein being longer than the stigmal, while the costal cell in the hind wings is long and narrow. The head is scarcely as wide as the thorax; eyes pubescent; antennæ rather long; the flagellum subclavate, not ringed with white; the funicle joints 2–6 transverse, the pedicel obconical, three times as long as thick, or longer than the first joint of the funicle. The head has the usual thimble-like punctuation, but the mesonotum is shagreened or rugulose, especially anteriorly, while the scutellum is more distinctly, although somewhat finely, shagreened.

1. RHYTIDOTHORAX MARLATTI Ashmead, new species.

Female.—Length, 1.65 mm. Black; scutellum and abdomen æneous; scape, the apical half of femora and all tibiæ and tarsi honey-yellow.

Type.—Cat. No. 4742, U.S.N.M. (Ashmead collection.)

Habitat.— Kansas: Riley County.

This interesting species was received many years ago from Mr. C. L. Marlatt.

50. TANAONEURA Howard.

1896. *Tanaoneura* HOWARD, Journ. Linn. Soc. Lond. Zool., XXVI, p. 146.

(Type, *Tanaoneura ashmeadii* Howard.)

1. TANAONEURA ASHMEADII Howard.

Tanaoneura ashmeadii HOWARD, Journ. Linn. Soc. Lond. Zool., XXVI, 1896, p. 147, female.—DALLA TORRE, Cat. Hym., V, p. 230.

Type in British Museum.

Habitat.—West Indies: Grenada.

51. HEXACLADIA Ashmead.

1891. *Hexacladia* ASHMEAD, Ins. Life, III, p. 456.

(Type, *Hexacladia smithii* Ashmead.)

1. HEXACLADIA SMITHII Ashmead.

Hexacladia smithii ASHMEAD, Ins. Life, III, 1891, p. 456, female and male.—DALLA TORRE, Cat. Hym., V, p. 230.

Type.—Cat. No. 4743, U.S.N.M. (Ashmead collection); also H. H. Smith collection.

Habitat.—South America.

52. HOMALOTYLUS Mayr.

1875. *Homalotylus* MAYR, Verh. Zool.-bot. Ges. Wien, XXV, p. 752.
1875. *Nobrimus* THOMSON, Hym. Skand., IV, pp. 116, 137.

(Type, *Encyrtus flaminius* Dalman.)

1. HOMALOTYLUS LACHNI Ashmead.

Homalotylus lachni ASHMEAD, Tr. Am. Ent. Soc., XIII, 1886, p. 132, female.—CRESSON, Syn. Hym. N. A., 1887, p. 240.—DALLA TORRE, Cat. Hym., V, 1898, p. 247.

Type.—Cat. No. 4744, U.S.N.M. (Ashmead collection.)
Habitat.—Florida: Jacksonville.
Host.—Rhynch.: *Lachnus australis* Ashmead. (?)

2. HOMALOTYLUS SIMILIS Ashmead.

Homalotylus similis ASHMEAD, Tr. Am. Ent. Soc., XIV, 1887, p. 190, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 247.

Type.—Cat. No. 4745, U.S.N.M. (Ashmead collection.)
Habitat.—Florida.

3. HOMALOTYLUS TERMINALIS Say.

Scrlion terminalis SAY, Maclur. Lyc. Phil., II, 1828, p. 80; Le Conte's ed. Say's Works, I, 1859, p. 383.
Scelio terminalis CRESSON, Syn. Hym. N. A., 1887, p. 248.—DALLA TORRE, Cat. Hym., V, 1898, p. 496.
Eutelus scymnæ SHIMER, Tr. Am. Ent. Soc., II, 1869, p. 385.—CRESSON, Syn. Hym. N. A., p. 242.—DALLA TORRE, Cat. Hym., V, 1898, p. 93.
Homalotylus obscurus HOWARD, Bull. No. 5, U. S. Dept. Agric., Div. Ent., 1885, p. 22, female.—HUBBARD, Orange Ins., 1886, p. 74, fig. 35.—HOWARD, Ins. Life, IV, 1891, p. 192, fig. 17.—DALLA TORRE, Cat. Hym., V, 1898, p. 247.
Homalotylus terminalis ASHMEAD, Proc. Ent. Soc. Wash., IV, 1898, p. 149.

Type.—Cat. No. 2648, U.S.N.M. (Howard's *obscurus*.)
Habitat.—North America.
Host.—Coleop.: *Scymnus* sp., *Cycloneda sanguinea* Linnæus, *Coccinella 9-notata* Herbst, *Psyllobora 20-maculata* Say, *Mysia pullata* Say, *Hippodamia convergens* Guerin.

53. ISODROMUS Howard.

1886. *Isodromus* HOWARD, Rep. U. S. Dept. Agric., p. 488.

(Type, *Isodromus iceryæ* Howard.)

1. ISODROMUS CHRYSOPÆ Ashmead.

Aphycus chrysopæ ASHMEAD, Ent. Amer., IV, 1888, p. 15, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 251.

Type.—Cat. No. 4746, U.S.N.M. (Ashmead collection.)
Habitat.—Florida: Jacksonville; and District of Columbia.
Host.—Neurop.: *Chrysopa* sp.

2. ISODROMUS ICERYÆ Howard.

Isodromus iceryæ HOWARD, Rep. U. S. Dept. Agric., 1886, p. 488, female.—CRESSON, Syn. Hym. N. A., 1887, p. 312, pl. III, fig. 1.—DALLA TORRE, Cat. Hym., V, 1898, p. 267.

Type.—Cat. No. 1491, U.S.N.M.
Habitat.—California.
Host.—Neurop.: *Chrysopa* sp. (not *Icerya purchasi*, as recorded).

3. ISODROMUS NIGER Ashmead, new species.

Female.—Length, 2 mm. Robust, black; the scape and flagellum *beneath* are brownish; the prothoracic scale margined with white; the tegulæ white at base; the front legs and the middle femora and tarsi, except the basal joint, honey-yellow; middle tibiæ and the hind legs, except the tarsi, brown-black; hind tarsi, basal joint of middle tarsi, and the tibial spurs, white. Wings clear hyaline.

Type.—Cat. No. 4747, U.S.N.M. (Ashmead collection.)

Habitat.—District of Columbia. Captured while ovipositing in an *immature* Chrysopid larva.

4. ISODROMUS ATRIVENTRIS Ashmead, new species.

Female.—Length, 2 mm. Ferruginous; the hind tibiæ and tarsi, the last four joints of the middle tarsi, and the flagellum are brown or fuscous; the disk of mesonotum is obfuscated; the metanotum and the abdomen are black; the tegulæ at base white, while the metapleura are clothed with a silvery pubescence. Front wings hyaline, with a large discoidal cloud beneath, and inclosing the stigmal vein.

Type.—Cat. No. 4748, U.S.N.M. (Ashmead collection.)

Habitat.—Canada: Ottawa. (W. H. Harrington.)

5. ISODROMUS PUNCTICEPS Howard.

Encyrtus punctiveps HOWARD, Bull. No. 5, U. S. Dept. Agric., Div. Ent., 1885, p. 14.—CRESSON, Syn. Hym. N. A., 1887, p. 239.—DALLA TORRE, Cat. Hym., V, 1898, p. 262.

Type.—Cat. No. 2635, U.S.N.M.

Habitat.—Virginia.

54. CERCHYSIUS Westwood.

1832. *Cerchysius* WESTWOOD, Phil. Mag. (3), I, p. 128.

1884. *Aseirba* CAMERON, Biol. Centr.-Am. Hym., I, p. 127 (teste Howard).

(Type, *Encyrtus subplanus* Dalman.)

1. CERCHYSIUS CAUDATA Cameron.

Aseirba caudata CAMERON, Biol. Centr.-Am. Hym., I, 1889, p. 127, female, pl. VI, fig. 13.

Cerchysius caudata HOWARD, Journ. Linn. Soc. Lond. Zool., XXV, 1894, p. 87.

Aseirba caudata DALLA TORRE, Cat. Hym., V, 1898, p. 244.

Habitat.—Guatemala.

2. CERCHYSIUS ELASMOCERI Ashmead, new species.

Female.—Length, 1.6 mm.; to tip of ovipositor, 2 mm. Robust, black with a faint bluish tinge, smooth impunctate except the frons, which is faintly shagreened. Antennæ black, the flagellum subfiliform, only slightly thickened toward apex, very little more than twice the length of the scape; funicle joints cylindrical, more than thrice longer than thick; pedicel obconical, shorter than the first funicle joint, with a

rufous tinge at apex. Mandibles rufo-piceous, 3-dentate. Thorax with a sparse pubescence, the metapleura with a silvery-white pubescence; the lunate mark before tegulæ wanting; scutellum finely, feebly shagreened; metathorax very short, polished. Legs ferruginous, the coxæ black, the femora brownish or obfuscated, excepting toward tips, the middle and hind tibiæ at base also obfuscated. Wings hyaline, the venation pale brownish, the stigmal vein oblique, about as long as the marginal and postmarginal veins united. Abdomen conico-ovate, as long as the head and thorax united, ending in a broadly compressed ovipositor which is longer than half the length of the abdomen.

Type.—Cat. No. 4749, U.S.N.M.

Habitat.—Virginia and District of Columbia.

Host.—Coleop.: *Elasmocerus terminatus* Say. Bred by Frank H. Chittenden.

3. CERCHYSIUS FLACCUS Walker.

Encyrtus (Cerchysius) flaccus WALKER, Ann. and Mag. Nat. Hist., XX, 1847, p. 21, female.—CRESSON, Syn. Hym. N. A., 1887, p. 2.

Cerchysius flaccus DALLA TORRE, Cat. Hym., V, 1898, p. 244.

Habitat.—Florida.

4. CERCHYSIUS HUBBARDII Ashmead, new species.

Female.—Length, 2.6 mm. Blue; head on vertex and the mesonotum metallic blue-green, the basal abdominal segments laterally blue-green; scape honey-yellow, the pedicel and the flagellum brown-black; legs, except coxæ, the base of anterior femora, and the basal two-thirds of hind femora pale ferruginous or brownish-yellow; sheaths of ovipositor very broad, testaceous. Wings hyaline, the tegulæ brown-black, the venation testaceous.

Type.—Cat. No. 5080, U.S.N.M.

Habitat.—California: Salton.

Bred by E. A. Schwarz from a beetle, *Vrelleta hubbardi* Schwarz manuscript, infesting the stems of *Alleuroffia occidentalis*, collected at Salton, California, by H. G. Hubbard, in March, 1897.

5. CERCHYSIUS (?) ICERYÆ Howard.

Cerchysius iceryæ HOWARD, Ins. Life, IV, 1892, p. 379, female.

Type.—Cat. No. 1490, U.S.N.M.

Habitat.—West Indies: Jamaica.

Host.—Rhynch.: *Icerya rosæ* Riley and Howard. This may not be a *Cerchysius* sens. str.

6. CERCHYSIUS PALLIDIPES Provancher.

Copidosoma pallipes PROVANCHER, Add. Fn. du Can. Hym., 1887, p. 205.—CRESSON, Syn. Hym., 1887, p. 239.—DALLA TORRE, Cat. Hym., V, 1898, p. 243.

Habitat.—Canada: Ottawa. (W. H. Harrington.)

55. SCEPTROPHORUS Förster.

1856. *Sceptrophorus* FÖRSTER, Hym. Stud., II, p. 34.
1875. *Trichomasthus* THOMSON, Hym. Skand., IV, p. 142.

(Type, *Sceptrophorus sceptriger* Förster.)

1. SCEPTROPHORUS HYALINIPENNIS Howard.

Psilophrys hyalinipennis HOWARD, Bull. No. 5, U. S. Dept. Agric., Div. Ent., 1885, p. 21, female.—CRESSON, Syn. Hym., 1887, p. 239.—DALLA TORRE, Cat. Hym., V, 1898.

Type.—Cat. No. 2647, U.S.N.M.
Habitat.—District of Columbia.

2. SCEPTROPHORUS CONVEXUS Howard.

Encyrtus convexus HOWARD, Journ. Linn. Soc. Lond. Zool., XXVI, 1896, p. 153, male.—DALLA TORRE, Cat. Hym., V, 1898, p. 257.

Type in British Museum.
Habitat.—West Indies: Grenada.

3. SCEPTROPHORUS SOLUS Howard.

Encyrtus solus HOWARD, Bull. No. 5, U. S. Dept. Agric., Div. Ent., 1885, p. 15, female.—CRESSON, Syn. Hym. N. A., 1887, p. 239.—DALLA TORRE, Cat. Hym., V, 1898, p. 263.

Type.—Cat. No. 2637, U.S.N.M.
Habitat.—Florida.
Host.—Rhynch.: *Trioza magnoliæ* Ashmead.

56. ECHTHROPLEXIS Förster.

1856. *Echthroplexis* FÖRSTER, Hym. Stud., II, p. 33.
1875. *Cœnocerus* THOMSON, Hym. Skand., IV, p. 145.

(Type, *Cœnocerus puncticollis* Thomson.)

1. ECHTHROPLEXIS PUNCTICOLLIS Thomson.

Cœnocerus puncticollis THOMSON, Hym. Skand., IV, 1875, p. 145, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 229.

Habitat.—Europe.

2. ECHTHROPLEXIS HIRTUS Howard.

Encyrtus hirtus HOWARD, Journ. Linn. Soc. Lond. Zool., XXV, 1894, p. 95.—DALLA TORRE, Cat. Hym., V, 1898, p. 259.

Habitat.—West Indies: St. Vincent.

57. OOENCYRTUS Ashmead, new genus.

(Type, *Encyrtus clisiocampæ* Ashmead.)

This genus is proposed for certain species described under the genus *Encyrtus* (sens. lat.), bred from the eggs of different insects, since they can be no longer retained in that genus as now restricted.

It is at once distinguished by the very minute, short, usually punctiform marginal vein, which is *not* or scarcely longer than thick, and the non-developed or extremely short post marginal vein, similar to *Copidosoma* Ratzeburg.

Its other characters, however, are quite different from that genus, the face being short, the antennal characters and punctuation being characteristic. It comes closest to *Prionomastix* Mayr, but its cephalic and antennal peculiarities, made use of in my table, readily separate it from this and allied genera.

Judging from their hosts, the European species *Encyrtus notodontæ*, *E. tardus* Ratzeburg (= *E. ovulorum* Forscolomb) and *E. embryophagus* Hartig, probably belong here.

Our species are are as follows:

1. OOENCYRTUS ANASÆ Ashmead.

Encyrtus anasæ Ashmead, Bull. No. 14, U. S. Dept. Agric., Div. Ent., 1887, p. 23, female.—Cresson, Syn. Hym. N. A., p. 312.—Dalla Torre, Cat. Hym., V, 1898, p. 254.

Type.—Cat. No. 2853, U.S.N.M.

Habitat.—Florida.

Host.—Rhynch.: Eggs *Anasa tristis* De Geer.

2. OOENCYRTUS CLISIOCAMPÆ Ashmead.

Encyrtus clisiocampæ Ashmead, Bull. Ohio Exp. Sta., I, 1893, p. 163, female and male.—Dalla Torre, Cat. Hym., V, 1898, p. 256.

Type.—Cat. No. 4750, U.S.N.M. (Ashmead collection.)

Habitat.—Ohio.

Host.—Lepid.: Eggs *Clisiocampa disstria* Hübner.

3. OOENCYRTUS GARGARIS Walker.

Encyrtus gargaris Walker, Ann. Mag. Nat. Hist., XII, 1843, p. 47, male.—Dalla Torre, Cat. Hym., V, 1898, p. 259.

Habitat.—West Indies: St. Vincent.

4. OOENCYRTUS JOHNSONI Howard.

Encyrtus johnsoni Howard, Can. Ent., XXX, 1899, p. 18.

Type.—Cat. No. 1424, U.S.N.M.

Habitat.—Maryland.

Host.—Rhynch.: Eggs *Murgantia histrionica* Hahn.

58. PSYLLÆPHAGUS Ashmead, new genus.

(Type, *Encyrtus pachypsyllæ* Howard.)

This genus comes closest to *Ooencyrtus*, but is at once distinguished by the broader vertex, the position of the lateral ocelli, and the distinct but short postmarginal vein, as pointed out in my table.

The species belonging to it seem to confine their attacks to nymphs in the Homopterous family Psyllidæ.

The following are the known species in North America:

1. PSYLLÆPHAGUS PACHYPSYLLÆ Howard.

Encyrtus pachypsyllæ HOWARD, Bull. No. 5, U. S. Dept. Agric., Div. Ent., 1885, p. 15, female and male.—CRESSON, Syn. Hym. N. A., 1887, p. 239.—DALLA TORRE, Cat. Hym., V, 1898, p. 262.

Type.—Cat. No. 2638, U.S.N.M.

Habitat.—Maryland.

Host.—Rhynch.: *Pachypsylla c.-gemma* Riley.

2. PSYLLÆPHAGUS TRIOZIPHAGUS Howard.

Encyrtus trioziphagus HOWARD, Bull. No. 5, U. S. Dept. Agric., Div. Ent., 1885, p. 14, female and male.—CRESSON, Syn. Hym. N. A., 1887, p. 239.—DALLA TORRE, Cat. Hym., V, 1898, p. 265.

Type.—Cat. No. 2636, U.S.N.M.

Habitat.—District of Columbia.

Host.—Rhynch.: *Trioza diospyri* Ashmead.

59. COCCIDENCYRTUS Ashmead, new genus.

(Type, *Encyrtus ensifer* Howard.)

Comes nearest to *Ooencyrtus* and *Psyllæphagus*, but easily separated by the longer or distinct postmarginal vein, and by the differences in the antennæ, the club in female being much longer than in those two genera, the pedicel shorter, and the funicle joints smaller, submoniliform. In the male the flagellum is much longer, ending in a distinct club, the funicle joints about twice as long as thick, subnodose above and with half whorls of long hairs. The head is transverse, as wide as the thorax, with a vertex of moderate width, not narrow, the ocelli triangularly arranged, the lateral ocelli not lying close to the eye margin—at least their width, or a little more, from it. Abdomen short, triangular, as viewed from above, with the ovipositor subexserted, the sheath projecting somewhat beyond the top of abdomen.

1. COCCIDENCYRTUS ENSIFER Howard.

Encyrtus ensifer HOWARD, Bull. No. 5, U. S. Dept. Agric., 1885, p. 13, female and male.—CRESSON, Syn. Hym. N. A., 1887, p. 239.—DALLA TORRE, Cat. Hym., V, 1898, p. 257.

Type.—Cat. No. 2633, U.S.N.M.

Habitat.—Florida.

Host.—Rhynch.: *Aspidiotus corticalis* Riley manuscript.

60. APHYCUS Mayr.

1875. *Aphycus* MAYR, Verh. Zool.-bot. Ges. Wien, XXV, p. 695.
1875. *Microterys* THOMSON (part), Hym. Skand., IV, p. 155 [sec. *cc*, p. 168].

(Type, *Encyrtus apicalis* Dalman.)

An excellent table by Dr. Howard for distinguishing the females of all the described species in this genus has been published.[1] The known species are as follows:

[1] Proceedings of the U. S. National Museum, XXI, 1899, p. 240.

1. APHYCUS AMŒNUS Howard.

Aphycus amœnus HOWARD, Journ. Linn. Soc. Lond. Zool., XXVI, 1896, p. 150, male.—DALLA TORRE, Cat. Hym., V, p. 251.

Type in British Museum.
Habitat.—West Indies: Grenada.

2. APHYCUS ANNULIPES Ashmead.

Coccophagus annulipes ASHMEAD, Can. Ent., XIV, 1882, p. 37, female.
Aphycus annulipes HOWARD, Bull. No. 5, U. S. Dept. Agric., Div. Ent., 1885, p. 19.—CRESSON, Syn. Hym. N. A., 1887, p. 238.—DALLA TORRE, Cat. Hym., V, 1898, p. 251.—HOWARD, Proc. U. S. Nat. Mus., XXI, p. 241.

Type.—Cat. No. 4751, U.S.N.M. (Ashmead collection.)
Habitat.—Florida: Jacksonville.
Host.—Rhynch.: *Lecanium* sp. on oak.

3. APHYCUS APICALIS Dalman.

Encyrtus apicalis DALMAN, Svensk. Vet.-Akad. Handl., XLI, 1820, p. 153, female.—NEES, Ichn. affin. Monogr., II, 1834, p. 220.—WALKER, Ent. Mag , V, 1837, p. 110, female.—RATZEBURG, Ichn. d. Forstins., II, 1848, p. 145.
Aphycus apicalis MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, pp. 695, 696, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 251.—HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, p. 241.
Microterys apicalis THOMSON, Hym. Skand., IV, 1875, p. 153.—DALLA TORRE, Cat. Hym., V, 1898, p. 233.

Habitat.—Europe and North America.
Host.—Rhynch.: *Pulvinaria carpini* Linnæus.

4. APHYCUS ANGELICUS Howard.

Aphycus angelicus HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, pp. 241, 245.

Type.—Cat. No. 5044, U.S.N.M.
Habitat.—California: Los Angeles.
Host.—Rhynch.: *Dactylopius* sp. on passion flower.

5. APHYCUS AUSTRALIENSIS Howard.

Aphycus australiensis HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, pp. 241, 245, female.

Type.—Cat. No. 5045, U.S.N.M.
Habitat.—Australia: Victoria, Melbourne.
Host.—Rhynch.: *Dactylopius* sp. on eucalyptus.

6. APHYCUS ALBERTI Howard.

Aphycus alberti HOWARD, Proc. U. S. Nat. Mus., XXI, pp. 241, 247, female and male.

Type.—Cat. No. 5051, U.S.N.M.
Habitat.—New South Wales: Sydney.
Host.—Rhynch.: *Lecanium hesperidum* Linnæus.

7. APHYCUS BRUNNEUS Howard.

Aphycus brunneus HOWARD, Bull. No. 5, U. S. Dept. Agric., Div. Ent., 1885, p. 17, female.—CRESSON, Syn. Hym. N. A., 1887, p. 238.—DALLA TORRE, Cat. Hym., V, 1898, p. 25.—HOWARD, Proc. U. S. Nat. Mus., XXI, p. 241.

Type.—Cat. No. 2642, U.S.N.M.
Habitat.—New York; New Jersey.
Host.—Rhynch.: *Diaspis rosæ* Bouché.

8. APHYCUS CALIFORNICUS Howard.

Aphycus californicus HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, pp. 241, 245, female.

Type.—Cat. No. 5043, U.S.N.M.
Habitat.—California: Alameda.
Host.—Rhynch.: *Lecanium* sp. on *Adenostoma fasciculatum.*

9. APHYCUS CEROPLASTIS Howard.

Aphycus ceroplastis HOWARD, Bull. No. 5, U. S. Dept. Agric., Div. Ent., 1885, p. 18, female and male.—CRESSON, Syn. Hym. N. A., 1887, p. 238.—DALLA TORRE, Cat. Hym., V, 1898, p. 241.—HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, p. 241.

Type.—Cat. No. 2643, U.S.N.M.
Habitat.—New Mexico.
Host.—Rhynch.: *Ceroplastes artemisiæ* Riley.

10. APHYCUS COCKERELLI Howard.

Aphycus cockerelli HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, pp. 240, 243, female.

Type.—Cat. No. 5038, U.S.N.M.
Habitat.—New Mexico: Las Cruces.
Host.—Rhynch.: *Lecanium* sp. on osage orange.

11. APHYCUS COQUILLETTI Howard.

Aphycus coquilletti HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, pp. 241, 244.

Type.—Cat. No. 5041, U.S.N.M.
Habitat.—California: Los Angeles.

12. APHYCUS DACTYLOPII Howard.

Aphycus dactylopii HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, pp. 240, 242.

Type.—Cat. No. 5036, U.S.N.M.
Habitat.—China: Hongkong.
Host.—Rhynch.: *Dactylopius vastator* Maskell.

13. APHYCUS ERUPTOR Howard.

Aphycus eruptor HOWARD, Rep. U. S. Dept. Agric., 1880-81, p. 364, pl. XXIII, fig. 5, female and male.—CRESSON, Syn. Hym. N. A., 1887, p. 238.—DALLA TORRE, Cat. Hym., V, 1898, p. 251.—HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, p. 241.

Type.—Cat. No. 2609, U.S.N.M.
Habitat.—Florida.
Host.—Rhynch.: *Lecanium* sp.

14. APHYCUS FLAVICEPS Howard.

Aphycus flariceps HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, pp. 241, 246, female.

Type.—Cat. No. 5049, U.S.N.M.

Habitat.—Illinois: Champaign.

Host.—Rhynch.: *Lecanium* sp.

15. APHYCUS FLAVUS Howard.

Aphycus flavus HOWARD, Rep. U. S. Dept. Agric., 1880–81, p. 19, female.—CRESSON, Syn. Hym. N. A., 1887, p. 228.—DALLA TORRE, Cat. Hym., V, 1898, p. 251.—HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, p. 241.

Type.—Cat. No. 2610, U.S.N.M.

Habitat.—Florida; West Indies: Grenada.

Host.—Rhynch.: *Mytilaspis citricola* Packard.

16. APHYCUS FUSCIPENNIS Howard.

Aphycus fuscipennis HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, pp. 240, 241.

Type.—Cat. No. 5033, U.S.N.M.

Habitat.—California: Sonoma County.

Host.—Rhynch.: *Lecanium* sp. on *Arctostaphylos pungens.*

17. APHYCUS HEDERACEUS Westwood.

Encyrtus hederaceus WESTWOOD, Phil. Mag. (3), X, 1837, p. 441.—WALKER, Ent. Mag., V, 1837, p. 107, female.

Encyrtus fulvifrons WALKER, Ent. Mag., V, 1837, p. 109, female.

Aphycus hederaceus MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, pp. 695, 696, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 251.—HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, p. 241.

Habitat.—Europe.

Host.—Rhynch.: *Lecanium phalaridis.*

18. APHYCUS IMMACULATUS Howard.

Aphycus immaculatus HOWARD, Ins. Life, VI, 1894, p. 236, fig. 1, male.—DALLA TORRE, Cat. Hym., V, p. 251.

Type.—Cat. No. 1474, U.S.N.M.

Habitat.—California.

Host.—Rhynch.: *Aspidiotus aurantii* Maskell.

19. APHYCUS JOHNSONI Howard.

Aphycus johnsoni HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, pp. 241, 244, female.

Type.—Cat. No. 5040, U.S.N.M.

Habitat.—Illinois: Champaign.

Host.—Rhynch.: *Lecanium* sp. on elm.

20. APHYCUS LECANII Howard.

Aphycus lecanii HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, pp. 240–242, female and male.

Type.—Cat. No. 5034, U.S.N.M.

Habitat.—California: Alameda and Los Angeles counties.

Host.—Rhynch.: *Lecanium* sp. on *Pinus insignis*, *Lecanium* sp. on *Heteromeles arbutifolia*, and a *Lecanium* sp. on *Quercus agrifolia.*

21. APHYCUS LICHTENSIÆ Howard.

Aphycus lichtensiæ HOWARD, Proc. U. S. Nat. Mus., XVIII, 1896, p. 640, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 251.—HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, p. 240.

Type.—Cat. No. 3259, U.S.N.M.
Habitat.—Ceylon.
Host.—Rhynch.: *Lichtensia koebelei* Maskell.

22. APHYCUS LOUNSBURYI Howard.

Aphycus lounsburyi HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, pp. 241, 244, female.

Type.—Cat. No. 5042, U.S.N.M.
Habitat.—South Africa: Cape Town.
Host.—Rhynch.: *Lecanium oleæ* Bernard.

23. APHYCUS MACULIPES Howard.

Aphycus maculipes HOWARD, Bull. No. 5, U. S. Dept. Agric., Div. Ent., 1885, p. 18, female and male.—CRESSON, Syn. Hym. N. A., 1887, p. 238.—DALLA TORRE, Cat. Hym., V, 1898, p. 252.—HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, p. 241.

Type.—Cat. No. 2644, U.S.N.M.
Habitat.—South Carolina.
Host.—Rhynch.: *Lecanium* sp. on water oak.

24. APHYCUS MEXICANUS Howard.

Aphycus mexicanus HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, pp. 241, 247, female.

Type.—Cat. No. 5050, U.S.N.M.
Habitat.—Louisiana: Baton Rouge; Mexico: City of Mexico.
Host.—Rhynch.: *Ceroplastes cerripediformis* Comstock and *Ceroplastes* sp.

25. APHYCUS NIGRITUS Howard.

Aphycus nigritus HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, pp. 241, 243.

Type.—Cat. No. 5039, U.S.N.M.
Habitat.—California: Los Angeles.
Host.—Rhynch.: *Dactylopius* sp. on *Artemisia.*

26. APHYCUS OAXACÆ Howard.

Aphycus oaxacæ HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, pp. 241, 246, female.

Type.—Cat. No. 5047, U.S.N.M.
Habitat.—Mexico: Oaxaca.

27. APHYCUS OREGONENSIS Howard.

Aphycus oregonensis HOWARD, Proc. U. S. Nat Mus., XXI, 1898, pp. 241, 246, female.

Type.—Cat. No. 5048, U.S.N.M.
Habitat.—Oregon: Aumsville, Marion County.
Host—Rhynch.: *Pulvinaria* sp. on Oregon flowering currant.

28. APHYCUS PULCHELLUS Howard.

Aphycus pulchellus HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, pp. 241, 242, female.

Type.—Cat. No. 5035, U.S.N.M.
Habitat.—New York: Ithaca.
Host.—Rhynch.: *Kermes* sp. on oak, *Quercus tinctoria.*

29. APHYCUS PUNCTIPES Dalman.

Encyrtus punctipes DALMAN, Svensk. Vet.-Akad. Handl., XLI, 1820, pp. 30, 370, pl. VIII, fig. 60.—NEES, Hym. Ichn. affin. Monogr., II, 1834, p. 201.—WALKER, Ent. Mag., V, 1837, p. 108, female and male.—STEPHENS, Illustr. Brit. Ent. Suppl., 1846, p. 9, pl. XLVI, fig. 4.—RATZEBURG, Ichn. d. Forstins., II, 1848, p. 146, female and male; III, 1852, p. 189, pl. III, fig. 14.—VOLLENHOVEN, Pinacogr., 1879, p. 55, pl. XXXV, fig. 7.

Aphycus punctipes MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, pp. 696, 697, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 252.—HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, p. 240, female.

Microterys punctipes THOMSON, Hym. Skand., IV, 1875, p. 168, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 238.

Habitat.—Europe; North America.
Host.—Rhynch.: *Pulvinaria vitis* Linnæus.

30. APHYCUS PULVINARIÆ Howard.

Aphycus pulvinariæ HOWARD, Rep. U. S. Dept. Agric., 1880-81, p. 18, female and male.—CRESSON, Syn. Hym. N. A., 1887, p. 238.

Type.—Cat. No. 2611, U.S.N.M.
Habitat.—Iowa.
Host.—Rhynch.: *Pulvinaria* sp.

31. APHYCUS TEXANUS Howard.

Aphycus texanus HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, pp. 241, 245, female.

Type.—Cat. No. 5046, U.S.N.M.
Habitat.—Texas: Brownsville.
Host.—Rhynch.: *Dactylopius virgatus* Cockerell.

32. APHYCUS TOWNSENDI Howard.

Aphycus townsendi HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, pp. 240, 243, female.

Type.—Cat. No. 5037, U.S.N.M.
Habitat.—New Mexico: Mesilla Park.
Host.—Rhynch.: *Phenacoccus* sp. on cotton.

61. HETERARTHRELLUS Howard.

1898. *Heterarthrellus* HOWARD, Proc. U. S. Nat. Mus., XXI, p. 239.

(Type, *Heterarthrellus australiensis* Howard.)

1. HETERARTHRELLUS AUSTRALIENSIS Howard.

Heterarthrellus australiensis HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, p. 239, female and male.

Type.—Cat. No. 5032, U.S.N.M.

Habitat.—New South Wales: Parametta.

Host.—Coleop.: *Scymnus flavifrons* Blackburn; *Rhizobius debilis* Blackburn.

62. ASTYMACHUS Howard.

1898. *Astymachus* HOWARD, Proc. U. S. Nat. Mus., XXI, p. 238.

(Type, *Astymachus japonicus* Howard.)

1. ASTYMACHUS JAPONICUS Howard.

Astymachus japonicus HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, p. 239.

Type.—Cat. No. 5031, U.S.N.M.

Habitat.—Japan: Gifu.

Host.—Rhynch.: Lecanium-like coccid on *Bambusa*.

63. BLASTOTHRIX Mayr.

1875. *Blastothrix* MAYR, Verh. Zool.-bot. Ges. Wien, XXV, p. 697.
1875. *Microterys* THOMSON (part), Hym. Skand., IV, p. 155 [Sec. A, p. 155].

(Type, *Encyrtus sericeus* Dalman.)

1. BLASTOTHRIX ADJUTABILIS Howard.

Blastothrix adjutabilis HOWARD, Rep. U. S. Dept. Agric., 1880–81, p. 365, female; pl XXIII, fig. 6.—CRESSON, Syn. Hym. N. A., 1887, p. 239.—DALLA TORRE, Cat. Hym., V, 1898, p. 252.

Type.—Cat. No. 2612, U.S.N.M.

Habitat.—Florida; Virginia.

Host.—Rhynch.: *Lecanium* sp.

2. BLASTOTHRIX INCERTA Howard.

Blastothrix incerta HOWARD, Rep. U. S. Dept. Agric., 1880–81, p. 366, male.—CRESSON, Syn. Hym. N. A., 1887, p. 239.—DALLA TORRE, Cat. Hym., V, 1898, p. 252.

Type.—Cat. No. 2613, U.S.N.M.

Habitat.—Florida.

Host.—*Lecanium* sp.

3. BLASTOTHRIX INSOLITA Howard.

Blastothrix insolita HOWARD, Journ. Linn. Soc. Lond. Zool., XXVI, 1896, p. 150, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 252.

Type in British Museum.

Habitat.—West Indies: Grenada.

4. BLASTOTHRIX SERICEA Dalman.

Encyrtus sericeus DALMAN, Svensk. Vet.-Akad. Handl., XLI, 1820, p. 357, female.
Encyrtus sericans DALMAN, Svensk. Vet.-Akad. Handl., XLI, 1820, p. 363, male.
Encyrtus sericeus NEES, Hym. Ichn. Affin. Monogr., II, 1834, p. 217, female.

Encyrtus sericans NEES, Ichn. Affin. Monogr., II, p. 247, male.

Encyrtus sericeus WALKER, Ent. Mag., V, 1837, p. 72, female and male.—RATZEBURG, Ichn. d. Forstins., III, 1852, p. 189, female.

Encyrtus sericans RATZEBURG, Ichn. d. Forstins., III, p. 193, male.

Microterys sericeus THOMSON, Hym. Skand., IV, 1875, p. 156, female and male.

Blastothrix sericeus MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, pp. 698–700, female and male.—WACHTL, Wien. Ent. Zeitg., I, 1882, p. 296.—DALLA TORRE, Nat. Hym., IV, p. 253.

Blastothrix longipennis HOWARD, Rep. U. S. Dept. Agric., 1880–81, p. 366, female.—CRESSON, Syn. Hym. N. A., 1887, p. 239.—DALLA TORRE, Cat. Hym., V, 1898, p. 252.

Type.—Cat. No. 2614, U.S.N.M. (*longipennis* Howard).

Habitat.—Europe; North America.

Hosts.—Rhynch.: *Pulvinaria vitis* Linnæus; *Lecanium æsculi* Kollar.

A common and widely distributed species.

5. BLASTOTHRIX YUCCÆ Coquillett.

Blastothrix yuccæ COQUILLETT, West Am. Scient., VII, 1890, p. 44.—DALLA TORRE, Cat. Hym., V, 1898, p. 253.

Type.—Cat. No. 1476, U.S.N.M.

Habitat.—California.

Host.—Rhynch.: *Pseudococcus yuccæ* Coquillett.

64. MICROTERYS Thomson.

1875. *Microterys* THOMSON (part), Hym. Skand., IV, p. 155 [Sec. B, p. 157].

(Type, *Encyrtus sylvius* Dalman.)

1. MICROTERYS CHALCOSTOMUS Dalman.

Encyrtus chalcostomus DALMAN, Svensk. Vet.-Akad. Handl., XLI, 1820, p. 342, female.—NEES, Hym. Ichn. Affin. Monogr., II, 1834, p. 207.

? Encyrtus astirus DALMAN, Svensk. Vet.-Akad. Handl., XLI, p. 365, male.—NEES, Hym. Ichn. Affin. Monogr., II, p. 250.

Encyrtus chalcostomus MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, pp. 706, 719, female.

Microterys chalcostomus THOMSON, Hym. Skand., IV, 1875, p. 159.—DALLA TORRE, Cat. Hym., V, 1898, p. 234.

Habitat.—Europe.

Host.—Rhynch.: *Lecanium æsculi* Kollar, *L. quercus* Linnæus.

2. MICROTERYS CINCTICORNIS Ashmead, new species.

This species probably represents a variety of the European *M. tessellatus* Dalman. It agrees with it in stature and in wing markings, except that the triangular white marginal spots are connected so as to form an additional band, while the head and thorax at sides, too, are quite differently colored. The head, the pronotum, except above, the sides of the thorax, and the legs, are brownish-yellow, while the mesonotum is metallic blue.

Type.—Cat. No. 4769, U.S.N.M. (Ashmead collection.)

Habitat.—New Hampshire: Mount Washington. (Mrs. A. T. Slosson.)

3. MICROTERYS CYANOCEPHALUS Dalman.

Encyrtus cyanocephalus DALMAN, Svensk. Vet.-Akad Handl., XLI, 1820, p. 344, female.—NEES, Hym. Ichn. Affin. Monogr., II, 1834, p. 211.—MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, pp. 709, 714, 720, female and male.

Microterys cyanocephalus THOMSON, Hym. Skand., IV, 1875, p. 159.—DALLA TORRE, Cat. Hym., V, 1898, p. 234.

Habitat.—Europe.

Host.—Rhynch.: *Pulvinaria carpini* Linnæus.

4. MICROTERYS FASCIPENNIS Dalman.

Encyrtus fascipennis DALMAN, Svensk. Vet.-Akad. Handl., XLI, 1820, p. 354, female.—NEES, Hym. Ichn. Affin. Monogr., II, 1834, p. 243.—MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, pp. 709, 721.

Microterys fascipennis THOMSON, Hym. Skand., IV, 1875, p. 161, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 234.

Habitat.—Europe.

Host.—Rhynch.: *Lecanium racemosum* Ratzeburg, *Physokermes abietis* Modeer.

5. MICROTERYS FLAVUS Howard.

Encyrtus flavus HOWARD, Rep. U. S. Dept. Agric., 1880–81, p. 367, female and male, pls. 236-238.—CRESSON, Syn. Hym. N. A., 1887, p. 239.—DALLA TORRE, Cat. Hym., V, 1898, p. 258.

Type.—Cat. No. 2615, U.S.N.M.

Habitat.—California.

Host.—Rhynch.: *Lecanium hesperidum* Linnæus, *L. piperis* Green.

6. MICROTERYS GASTRON Walker.

Encyrtus gastron WALKER, Ann. and Mag. Nat. Hist., XX, 1847, p. 21, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 259.

Habitat.—Florida.

7. MICROTERYS INTERPUNCTUS Dalman.

Encyrtus interpunctus DALMAN, Svensk. Vet.-Akad. Handl., XLI, 1820, p. 157, female.—NEES, Hym. Ichn. Affin. Monogr., II, 1834, p. 209.—MAYR, Verh. Zool.-bot. Ges. Wien, 1875, pp. 708, 720.

Microterys interpunctus THOMSON, Hym. Skand., IV, 1875, p. 160.—DALLA TORRE, Cat. Hym., V, 1898, p. 234.

Habitat.—Europe; North America.

8. MICROTERYS IMBRASUS Walker.

Encyrtus imbrasus WALKER, Ann. and Mag. Nat. Hist., XX, 1847, p. 23.—CRESSON, Syn. Hym. N. A., 1887, p. 239.—DALLA TORRE, Cat. Hym., V, 1898, p. 259.

Habitat.—North America.

9. MICROTERYS LICHTENSIÆ Howard.

Encyrtus lichtensiæ HOWARD, Proc. U. S. Nat. Mus., XVIII, 1896, p. 63[3], female — DALLA TORRE, Cat. Hym., V, 1898, p. 620.

Type.—Cat. No. 3252, U.S.N.M.
Habitat.—Ceylon.
Host.—Rhynch.: *Lichtensia koebelei* Maskell.

10. MICROTERYS LUNATUS Dalman.

Encyrtus lunatus DALMAN, Svensk. Vet.-Akad. Handl., XLI, 1820, p. 156, female.
(?) *Encyrtus aestivus* NEES, Hym. Ichn. Affin. Monogr., II, 1834, p. 250, male; Hym. Ichn. Affin. Monogr., II, 1834, p. 250.
Encyrtus cedrenus WALKER, Ent. Mag., V, 1837, p. 112, female.
Encyrtus lunatus ZETTERSTEDT, Ins. Lappon., I, 1838, p. 431.
Encyrtus cleone WALKER, Ann. and Mag. Nat. Hist., XIV, 1844, p. 407, female.
Encyrtus lunatus MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, pp. 706, 715, 719, female.—VOLLENHOVEN, Pinacogr., 1879, p. 55, pl. XXXV, fig. 8.
Microterys lunatus THOMSON, Hym. Skand., IV, 1875, p. 161, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 255.

Habitat.—Europe; North America.

11. MICROTERYS MARGINATUS Ashmead, new species.

Female.—Length, 1.5 mm. Ferruginous; the mesonotum and the scutellum with a brownish metallic tinge; abdomen aeneous black; joints 3–6 of funicle white; club black; wings dark fuscous with the extreme apical margins white.

Type.—Cat. No. 4770, U.S.N.M. (Ashmead collection.)
Habitat.—New Mexico.

Described from specimen received some years ago from Prof. T. D. A. Cockerell.

12. MICROTERYS MONTiNUS Packard.

Encyrtus montinus PACKARD, Proc. Bost. Soc. Nat. Hist., XXI, 1881, p. 31, female.—CRESSON, Syn. Hym. N. A., 1887, p. 239.—HOWARD, Proc. Wash. Ent. Soc., I, 1888, p. 91; in Scudder's Butterflies, East U. S., 1889, p. 1887, female; pl. LXXXIX, fig. 4.—DALLA TORRE, Cat. Hym., V, 1898, p. 261.

Type in Museum of Comparative Zoology, Cambridge, Massachusetts.
Habitat.—New Hampshire.
Host.—Lepid.: *Chionobas semidea* Say.

13. MICROTERYS SUBCUPRATUS Dalman.

Encyrtus subcupratus DALMAN, Svensk. Vet.-Akad. Handl., XLI, 1820, p. 346, female.—NEES, Hym. Ichn. Affin. Monogr., II, 1834, p. 215, female.—WALKER, Ent. Mag., IV, 1837, p. 460, female and male.
Microterys subcupratus THOMSON, Hym. Skand., IV, 1875, p. 161, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 235.

Habitat.—Europe.

14. MICROTERYS SUBLESTUS Howard.

Encyrtus sublestus HOWARD, Bull. No. 5, U. S. Dept. Agric., Div. Ent., 1885, p. 12, male.—CRESSON, Syn. Hym. N. A., 1887, p. 239.—DALLA TORRE, Cat. Hym., V, 1898, p. 264.

Type.—Cat. No. 2632, U.S.N.M.
Habitat.—Florida.
Host.—Rhynch.: *Lecanium* sp.

15. MICROTERYS SYLVIUS Dalman.

——— ——— FRISCH, Beschr. Ins. Teutschl., IX, 1730, p. 38, pl. III, fig. 22.
Encyrtus sylvius DALMAN, Svensk. Vet.-Akad. Handl., XLI, 1820, p. 154, female.
Encyrtus zephyrinus DALMAN, Svensk. Vet.-Akad. Handl., XLI, p. 167, male.
Encyrtus sylvius NEES, Hym. Ichn. Affin. Monogr., II, 1834, p. 205.
Encyrtus zephyrinus NEES, Ichn. Affin. Monogr., II, p. 245.
Encyrtus sylvius WALKER, Ent. Mag., V, 1837, p. 103, female.—RATZEBURG, Ichn. d. Forstins., I, 1844, p. 214.
Encyrtus zephyrinus RATZEBURG, Ichn. d. Forstins., I, p. 214.
Encyrtus sylvius MAYR, Verh. Zool.-bot. Ges. Wien, XXV, pp. 706, 714, 719, female and male.
Microterys sylvius THOMSON, Hym. Skand., IV, p. 157.—DALLA TORRE, Cat. Hym., V, p. 235.

Habitat.—Europe; North America; Canada.
Hosts.—Rhynch.: *Palvinaria betulæ* Linnæus, *Lecanium pruni*, *L. coryli* Linnæus, *L. æsculi* Kollar.

16. MICROTERYS TACHARDIÆ Howard.

Encyrtus tachardiæ HOWARD, Proc. U. S. Nat. Mus., XVIII, 1896, p. 637, male.—DALLA TORRE, Cat. Hym., V, 1898, p. 264.

Type.—Cat. No. 3253, U.S.N.M.
Habitat.—Ceylon.
Host.—Rhynch.: *Tachardia albizziæ* Green.

17. MICROTERYS TESSELLATUS Dalman.

Encyrtus tessellatus DALMAN, Svensk. Vet.-Akad. Handl., XLI, 1820, p. 342, female.—NEES, Hym. Ichn. affin. Monogr., II, 1834, p. 209.—WALKER, Ent. Mag., V, 1837, p. 55, female.—MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, p. 708, 720, female.
Microterys tessellatus THOMSON, Hym. Skand., IV, 1898, p. 160, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 236.

Habitat.—Europe.

18. (?) MICROTERYS BOLUS Walker.

Encyrtus botus WALKER, Ann. and Mag. Nat. Hist., XIV, 1844, p. 17, female.—CRESSON, Syn. Hym. N. A., 1887, p. 239.—DALLA TORRE, Cat. Hym., V, 1898, p. 256.

Habitat.—Hudson Bay.
Host.—Rhynch.: Coccid on willows.

19. (?) MICROTERYS DUBIUS Howard.

Encyrtus dubius HOWARD, Ins. Life, I, 1880, p. 270, fig. 66, male.
Encyrtus dubiosus DALLA TORRE, Cat. Hym., V, 1898, p. 257.

Type.—Cat. No. 2704, U.S.N.M.
Habitat.—California.
Host.—Rhynch.: *Icerya purchasi* Maskell.

20. MICROTERYS FUSCICORNIS Howard.

Encyrtus fuscicornis HOWARD, Bull. No. 5, U. S. Dept. Agric., Div. Ent., 1885, p. 13, female.—CRESSON, Syn. Hym. N. A., 1887, p. 239.—DALLA TORRE, Cat. Hym., V, 1898, p. 258.

Type.—Cat. No. 2634, U.S.N.M.
Habitat.—Maryland.

65. HOLCENCYRTUS Ashmead, new genus.

(Type, *Aphycus niger* Ashmead.)

Resembles both *Aphycus* and *Blastothrix*. The front wings have a hairless oblique line, extending from base of stigmal vein to the hind margin as in *Aphycus*, but the venation is quite different: The marginal vein is distinct, *not* punctiform, although shorter than the stigmal vein; the postmarginal vein is long, well developed, and a little longer than the marginal and stigmal veins united. The antennæ are subclavate, the scape only slightly thickened towards tip, and not at all dilated beneath, as in *Aphycus* and *Blastothrix*, while all the joints of the funicle, in the male, are wider than long, neither subdentate, nor with half whorls of hairs, as in *Blastothrix*. The body, at the most, is clothed with a fine, sparse pubescence; the head and thorax are subopaque, finely coriaceous; the frons broad; the ocelli arranged in a triangle, the lateral far from the eye margin; scrobes distinct; scutellum a little longer than the mesonotum, with a delicate grooved line at the basal half; metathorax very short, abrupt; abdomen small, oval, depressed, scarcely two-thirds the length of the thorax.

1. HOLCENCYRTUS NIGER Ashmead.

Aphycus niger ASHMEAD, Ent. Amer., IV, 1888, p. 15, male.—DALLA TORRE, Cat. Hym., V, 1898, p. 252.

Type.—Cat. No. 4752, U.S.N.M. (Ashmead collection.)
Habitat.—Florida: Jacksonville.

66. AGENIASPIS Dahlbom.

1857. *Ageniaspis* DAHLBOM, Öfvers. Svensk. Vet.-Akad. Förh., XIV, p. 297.
1875. *Holcothorax* MAYR, Verh. Zool.-bot. Ges. Wien, XXV, p. 69.

(Type, *Encyrtus fuscicollis* Dalman.)

1. AGENIASPIS ATRICOLLIS Dalman.

Encyrtus atricollis DALMAN, Svensk. Vet.-Akad. Handl., XLI, 1820, p. 358, female.—NEES, Hym., Ichn. affin. Monogr., II, 1834, p. 237, female.

Ichneumon (*Encyrtus*) *atricollis* RATZEBURG, Ichn. d. Forstins., 1844, p. 29, pl. VIII, fig. 13.

Encyrtus atricollis RATZEBURG, Ichn. d. Forstins., I, 1844, p. 213, female and male; II, 1848, p. 146, pl. VIII, fig. 13; III, 1852, p. 190.

Holcothorax atricollis MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, pp. 693, 694, female.

Ageniaspis atricollis THOMSON, Hym. Skand., IV, 1875, p. 182, female and male.—DALLA TORRE, Cat. Hym., V, 1998, p. 250.

Habitat.—Europe.

Host.—Lepid.: *Tinea evonymella* Linnæus, *T. padella* Linnæus.

2. AGENIASPIS FUSCICOLLIS Dalman.

Encyrtus fuscicollis DALMAN, Svensk. Vet.-Akad. Handl., XLI, 1820, p. 359, female and male.

Pteromalus cyanocephalus BOUCHÉ, Naturg. d. Ins., 1834, p. 167.

Encyrtus fuscicollis NEES, Hym. Ichn. affin. Monogr., II, 1834, p. 236; Hym. Ichn. affin. Monogr., II, p. 434.—WALKER, Ent. Mag., V, 1838, p. 420, female and male.

Encyrtus cyanocephalus WALKER, Ent. Mag., VI, p. 421.—GOUREAU, Ann. Soc. Ent. France (2), V, 1847, p. 244.

Holcothorax fuscicollis MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, p. 693, female and male.

Ageniaspis fuscicollis THOMSON, Hym. Skand., IV, 1875, p. 82, female.

Encyrtus fuscicollis BUGNION, Rec. Zool. Suisse, V, 1890, p. 435; types 20 to 22.

Ageniaspis fuscicollis DALLA TORRE, Cat. Hym., V, 1898, p. 250.—MARCHAL, Compt. rend. Soc. Biol., July 22, 1899.

Habitat.—Europe.

Host.—Lepid.: *Hyponomeuta evonymella* Linnæus, and *H. cognatella* Treitsche and *H. padella* Linnaeus.

3. AGENIASPIS NEPTICULÆ Mayr.

Holcothorax nepticulæ MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1895, pp. 692, 693, female.

Ageniaspis nepticulæ DALLA TORRE, Cat. Hym., V, 1898, p. 250.

Habitat.—Europe.

Host.—Lepid.: *Nepticula splendidissimella* Herrich-Schaeffer.

4. AGENIASPIS TESTACEIPES Ratzeburg.

Encyrtus testaceipes RATZEBURG, Ichn. d. Forstins., II, 1848, p. 148, pl. III, fig. 5.

Holcothorax testaceipes MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, pp. 692, 693, female and male.

Ageniaspis testaceipes DALLA TORRE, Cat. Hym., V, 198, p. 250.

Habitat.—Europe.

Host.—Lepid.: *Lithocolletis quercifoliella* Zeller, *L. cramerella* Fabricius, *L. complanella* Hübner, *L. populifoliella* Treitsche, and *L. alniella* Zeller.

5. AGENIASPIS BUCCULATRICIS Howard.

Encyrtus bucculatricis HOWARD, in Lintner's First Ann. Rep. N. Y., 1882, p. 160, fig. 43.—CRESSON, Syn. Hym. N. A., 1887, p. 239.—DALLA TORRE, Cat. Hym., V, 1898, p. 256.

Type.—Cat. No. 4768, U.S.N.M.

Habitat.—New York.

Host.—Lepid.: *Bucculatrix pomifoliella* Clemens.

67. PSEUDENCYRTUS Ashmead, new genus.

(Type, *Encyrtus cecidomyiæ* Howard.)

To this genus belong several species placed by writers in *Encyrtus* (sens. lat.). It is founded upon *Encyrtus cecidomyiæ* Howard, and to it belongs also the European species *Encyrtus clavellatus* Dalman.

The species are strongly metallic and live parasitically in the Dipterous larvæ belonging to the family Cecidomyidæ.

The thorax is smooth, impunctate, or at most with a delicate, microscopically reticulate punctuation; the stigmal vein is rather long, oblique, and usually a little longer than the marginal and postmarginal veins united; the axillæ do not quite meet at their inner basal angles; the antennæ are moderately long, subclavate, the 3-jointed club not much enlarged, only about half the length of the funicle or less, and not much thicker than the terminal joint of the funicle; the funicle 6-jointed, subcylindrical, the joints all longer than wide, never moniliform, while the abdomen in female, in outline, is conic-ovate, depressed above and usually somewhat longer than the head and thorax united, or at least as long, the ovipositor always slightly exserted.

1. PSEUDENCYRTUS CECIDOMYIÆ Howard.

Encyrtus cecidomyiæ Howard, Bull. No. 5, U. S. Dept. Agric., Div. Ent., 1885, p. 16, female and male.—Cresson, Syn. Hym. N. A., 1887, p. 239.—Dalla Torre, Cat. Hym., V, 1898, p. 256.

Type.—Cat. No. 2639, U.S.N.M.

Habitat.—Virginia; New York.

Host.—Dipt.: *Cecidomyia salicis-siliqua* Walsh.

2. PSEUDENCYRTUS NITIDUS Howard.

Encyrtus nitidus Howard, Journ. Linn. Soc. Lond. Zool., XXV, 1894, p. 94, female.—Dalla Torre, Cat. Hym., V, 1898, p. 261.

Type.—Cat. No. 2722, U.S.N.M.; also in British Museum.

Habitat.—West Indies: St. Vincent.

3. PSEUDENCYRTUS ROTUNDIFORMIS Howard.

Encyrtus rotundiformis Howard, Journ. Linn. Soc. Lond. Zool., XXVI, 1896, p. 154, female.—Dalla Torre, Cat. Hym., V, 1898, p. 263.

Type.—Cat. No. 4852, U.S.N.M.; also in British Museum.

Habitat.—West Indies: Grenada.

To this genus also probably belong the European species *Microterys barbarus* Dalman, and *M. brevicornis* Dalman.

68. EPIENCYRTUS Ashmead, new genus.

(Type, *Encyrtus thyreodontis* Ashmead.)

This genus represents part of a group to which European writers have applied the generic term *Encyrtus* Dalman. The types of the genus are *Encyrtus thyreodontis* Ashmead and *Enc. melanacis* Dalman.

It comprises a group which appears to be hyperparasitic on Ichneumon flies belonging to the subfamily *Ophioninæ;* at least such appears to be the case with two of the North American species, and I should not be surprised to find all the species, falling in the genus, hyperparasitic.

The stigmal vein is never longer than the marginal and postmarginal united, most frequently distinctly shorter; the axillæ usually meet at their inner basal angle; the antennæ are rather short, the club much enlarged, as long, longer, or nearly as long as the funicle, and from two to three or more times wider than the last joint of the funicle; the funicle is 6-jointed, short, the joints transverse wider than long, or at least the 3 or 4 terminal joints, or the first 3 or 4 joints are moniliform, while the abdomen is ovate or pointed ovate, but not longer than the head and thorax united, usually somewhat shorter, the ovipositor not or only slightly extending beyond the tip of the abdomen.

1. **EPIENCYRTUS ARTACEÆ** Howard.

Encyrtus artaceæ HOWARD, Rep. U. S. Dept. Agric., 1880–81, p. 252, female and male.—CRESSON, Syn. Hym. N. A., 1887, p. 239.—DALLA TORRE, Cat. Hym., V, 1898, p. 255.

Type.—Cat. No. 1469, U.S.N.M.

Habitat.—Florida.

Host.—Lepid.: *Artace punctistriga* Walker, affected by an Ophionid.

2. **EPIENCYRTUS THYREODONTIS** Ashmead.

Encyrtus thyreodontis ASHMEAD, Proc. Wash. Ent. Soc., IV, 1898, p. 156, female and male.

Type.—Cat. No. 4753, U.S.N.M. (Ashmead collection.)

Habitat.—Massachusetts: Cambridge.

Host.—Hymen.: *Thyreodon morio* Fabricius.

3. **EPIENCYRTUS MELANACIS** Dalman.

Encyrtus melanacis DALMAN, Svensk. Vet.-Akad. Handl., XLI, 1820, p. 345, female.—NEES, Ichn. Affin. Monogr., II, 1834, p. 213, female.—MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, p. 701, female.

Microterys melanacis THOMSON, Hym. Skand., IV, 1875, p. 167, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 285.

Habitat.—Europe.

4. **EPIENCYRTUS SORDIDUS** Howard.

Encyrtus sordidus HOWARD, Journ. Linn. Soc. Lond., Zool., XXVI, 1896, p. 153, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 263.

Habitat.—West Indies: Grenada.

69. SYRPHOPHAGUS Ashmead, new genus.

(Type, *Encyrtus mesograptæ* Ashmead.)

In wing venation this genus comes nearest to *Epiencyrtus*, but is easily separated, in the female sex, by the marked difference in the antennæ brought out in my table.

1. (?) SYRPHOPHAGUS FLAVICLAVUS Howard.

Encyrtus flaviclavus HOWARD, Journ. Linn. Soc. Lond., Zool., XXV, 1896, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 258.

Habitat.—West Indies: St. Vincent.

2. SYRPHOPHAGUS MESOGRAPTÆ Ashmead.

Encyrtus mesograptæ ASHMEAD, Tr. Am. Ent. Soc., XXIII, 1896, p. 232, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 261.

Type.—Cat. No. 4754, U.S.N.M. (Ashmead collection.)
Habitat.—Florida.
Host.—Dipt.: *Mesograpta polita* Say.

3. SYRPHOPHAGUS QUADRIMACULATÆ Ashmead.

Pteromalus 4-maculatæ ASHMEAD (part), Tr. Am. Ent. Soc., XIV, 1887, p. 191.

Type.—Cat. No. 4755, U.S.N.M. (Ashmead collection.)
Habitat.—Florida.
Host.—Dipt.: *Syrphus ribesii* Linnæus.

4. SYRPHOPHAGUS MODERATUS Howard.

Encyrtus moderatus HOWARD, Journ. Linn. Soc. Lond., Zool., XXVI, 1896, p. 152, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 261.

Type.—Cat. No. 4756, U.S.N.M.; also in British Museum.
Habitat.—West Indies: Grenada.

5. SYRPHOPHAGUS SUBMETALLICUS Howard.

Encyrtus submetallicus HOWARD, Journ. Linn. Soc. Lond., Zool., XXVI, 1896, p. 157, female.—DALLA TORRE, Cat. Hym., V, p. 264.

Type.—Cat. No. 4757, U.S.N.M.; also in British Museum.
Habitat.—West Indies: Grenada.

6. SYRPHOPHAGUS VECTIUS Walker.

Encyrtus vectius WALKER, Ann. and Mag. N. Hist., XX, 1847, p. 21, male.—CRESSON, Syn. Hym. N. A., 1887, p. 239.—DALLA TORRE, Cat. Hym., V, 1898, p. 265.

Habitat.—Florida.

70. APHIDENCYRTUS Ashmead, new genus.

(Type, *Encyrtus aphidiphagus* Ashmead.)

The characters used in my table of genera readily separate this genus from *Pseudencyrtus* and *Epencyrtus*, the only genera, except possibly *Ooencyrtus*, with which it could be confused. Its resemblance to the last-mentioned genus, lies only in venational characteristics, since the marginal vein is also short, nearly punctiform; the other characters mentioned may, however, be depended upon to distinguish it.

All of the species falling in this genus, known to me, are parasitic on Homopterous insects belonging to the family Aphididæ. It is also prob-

able, judging from the host, that the European *Encyrtus aphidivorus* Mayr (= *E. athaas* Girard), a species I have not seen, belongs here.

The North American species are:

1. APHIDENCYRTUS APHIDIPHAGUS Ashmead.

Encyrtus aphidiphagus ASHMEAD, Bull. No. 14, U. S. Dept. Agric., Div. Ent., 1887, p. 14, female.—CRESSON, Syn. Hym. N. A., 1887, p. 312.—DALLA TORRE, Cat. Hym., V, p. 255.

Type.—Cat. Nos. 2846, female, 4758, male, U. S. N. M. (Ashmead collection.)

Habitat.—Florida: Jacksonville.

Host.—Rhynch.: *Aphis brassicæ* Linnæus.

2. APHIDENCYRTUS LACHNI Ashmead.

Encyrtus lachni ASHMEAD, Tr. Am. Ent. Soc., XII, 1885, Proc., p. XVI, female.—CRESSON, Syn. Hym. N. A., 1887, p. 239.—DALLA TORRE, Cat. Hym., V, p. 260.

Type.—Cat. No. 4759, U.S.N.M. (Ashmead collection.)

Habitat.—Florida.

Host.—Rhynch.: *Lachnus australis* Ashmead.

3. APHIDENCYRTUS MEGOURÆ Ashmead.

Encyrtus megouræ ASHMEAD, Bull. No. 14, U. S. Dept. Agric., Div. Ent., 1887, p. 19, female and male.—CRESSON, Syn. Hym. N. A., 1887, p. 312.—DALLA TORRE, Cat. Hym., V, p. 260.

Type.—Cat. No. 2851, U.S.N.M. (Ashmead collection.)

Habitat.—Florida: Jacksonville.

Host.—Rhynch.: *Megoura solani* Thomas.

4. APHIDENCYRTUS ROSÆ Ashmead.

Blastothrix rosæ ASHMEAD, Tr. Am. Ent. Soc., XIII, 1886, p. 130, female.—CRESSON, Syn. Hym. N. A., 1887, p. 239.—DALLA TORRE, Cat. Hym., V, 1898, p. 253.

Type.—Cat. No. 4760, U.S.N.M. (Ashmead collection.)

Habitat.—Florida.

Host.—Rhynch.: *Siphonophora rosæ* var. *floridæ* Ashmead.

5. APHIDENCYRTUS SCHIZONEURÆ Ashmead.

Encyrtus schizoneuræ ASHMEAD, Tr. Am. Ent. Soc., XII, 1885, Proc., p. XVI, female and male.—CRESSON, Syn. Hym. N. A., 1887, p. 239.—DALLA TORRE, Cat. Hym., V, p. 263.

Type.—Cat. No. 4761, U.S.N.M. (Ashmead collection.)

Habitat.—Florida: Jacksonville.

Host.—Rhynch.: *Schizoneura aquatica* Ashmead.

6. APHIDENCYRTUS SIPHONOPHORÆ Ashmead.

Encyrtus siphonophoræ ASHMEAD, Tr. Am. Ent. Soc., XII, 1886, p. 131, female.—CRESSON, Syn. Hym. N. A., 1887, p. 239.—DALLA TORRE, Cat. Hym., V, 1898, p. 263.

Type.—Cat. No. 4761, U.S.N.M. (Ashmead collection.)

Habitat.—Florida: Jacksonville.

Host.—Rhynch.: *Siphonophora citrifolii* Ashmead.

7. APHIDENCYRTUS WEBSTERI Howard.

Encyrtus websteri HOWARD, Ins. Life, II, 1890, p. 247, female and male; fig. 14, male.—DALLA TORRE, Cat. Hym., V, 1898, p. 265.

Type.—Cat. No. 1483, U.S.N.M.
Habitat.—Indiana.
Host.—Rhynch.: *Siphonophora avenæ* Fabricius.

71. CHOREIA Westwood.

1833. *Choreia* WESTWOOD, Mag. Nat. Hist., VI, p. 122.
1871. *Choria* VOLLENHOVEN, Schets. Tab. 7.

(Type, *Encyrtus ineptus* Dalman.)

Dalla Torre[1] has placed as a synonym of this genus *Crantor* Haliday.[2] Haliday's brief description applies, however, to a wingless form of an *Aphelinus*, and not to this genus.

72. CHEILONEURUS Westwood.

1833. *Cheiloneurus* WESTWOOD, Phil. Mag. (3), III, p. 343.
1856. *Chiloneurus* FÖRSTER, Hym. Stud., II, p. 32.
1856. *Sterrhocoma* FÖRSTER, Hym. Stud., II, p. 37, female.

(Type, *Cheiloneurus formosus* Westwood.)

1. CHEILONEURUS ALBICORNIS Howard.

Chiloneurus albicornis HOWARD, Rep. U. S. Dept. Agric., 1880, p. 363, pl. 1, fig. 4, female; Bull. No. 5, U. S. Dept. Agric., 1885, p. 16, female.—CRESSON, Syn. Hym. N. A., 1887, p. 240.—DALLA TORRE, Cat. Hym., V, p. 241.

Type.—Cat. No. 2608, U.S.N.M.
Habitat.—Washington.
Host.—Rhynch.: *Lecanium* sp.

2. CHEILONEURUS CUPREICOLLIS Ashmead.

Chiloneurus cupreicollis ASHMEAD, Tr. Am. Ent. Soc., XIII, 1886, p. 131, female.—CRESSON, Syn. Hym. N. A., 1887, p. 240.—DALLA TORRE, Cat. Hym., V, p. 241.

Type.—Cat. No. 4762, U.S.N.M. (Ashmead collection.)
Habitat.—Florida: Jacksonville.

3. CHEILONEURUS DACTYLOPII Howard.

Chiloneurus dactylopii HOWARD, Bull. No. 5, U. S. Dept. Agric., 1885, p. 17, female and male.—CRESSON, Syn. Hym. N. A., 1887, p. 240.—DALLA TORRE, Cat. Hym., V, p. 241.

Type.—Cat. No. 2641, U.S.N.M.
Habitat.—Washington.
Host.—Rhynch.: *Dactylopius destructor* Comstock.

[1] Cat. Hym., V, p. 248. [2] Ent. Mag., I, p. 268.

4. CHEILONEURUS DIASPIDINARUM Howard.

Chiloneurus diaspidinarum HOWARD, Ins. Life, VII, 1894, p. 256, female.—DALLA TORRE, Cat. Hym., V, p. 241.

Type.—Cat. No. 1489, U.S.N.M.
Habitat.—South Carolina: Liberty County.
Host.—Rhynch.: *Mytilaspis pomorum* Bouché.

5. CHEILONEURUS DUBIUS Howard.

Chiloneurus dubius HOWARD, Bull. No. 5, U. S. Dept. Agric., 1885, p. 17, male.—CRESSON, Syn. Hym. N. A., 1887, p. 240.—DALLA TORRE, Cat. Hym., V, p. 241.

Type.—Cat. No. 2640, U.S.N.M.
Habitat.—Wisconsin.
Host.—Rhynch.: *Lecanium* sp.

6. CHEILONEURUS FUNICULUS Howard.

Chiloneurus funiculus HOWARD, Journ. Linn. Soc. Lond., Zool., XXVI, p. 148, female.—DALLA TORRE, Cat. Hym., V, p. 242.

Type in British Museum.
Habitat.—West Indies: Grenada.

7. CHEILONEURUS NIGRESCENS Howard.

Chiloneurus nigrescens HOWARD, Journ. Linn. Soc. Lond., Zool., XXVI, p. 148, female.—DALLA TORRE, Cat. Hym., V, p. 242.

Type in British Museum.
Habitat.—West Indies: Grenada.

73. ZAOMMA Ashmead, new genus.

(Type, *Encyrtus argentipes* Howard.)

This genus may be at once recognized by the very large rounded eyes, which converge above and leave a very narrow linear vertex; by the very short antennæ which have the club enormously enlarged, longer than the funicle and many times thicker, the joints of the funicle being transverse; and by the clear hyaline wings.

1. ZAOMMA ARGENTIPES Howard.

Encyrtus argentipes HOWARD, Journ. Linn. Soc. Lond., XXV, 1894, p. 95, female.—DALLA TORRE, Cat. Hym., V, p. 255.

Type.—Cat. No. 2723, U.S.N.M.; British Museum.
Habitat.—West Indies: St. Vincent.

74. ADELENCYRTUS Ashmead, new genus.

(Type, *Encyrtus chionaspidis* Howard.)

Comes nearest to *Zaomma* Ashmead. Head in female viewed from in front wider than long with the scrobes deep, semicircular. Antennæ short, the flagellum clavate, the club enlarged, but not enormously so,

as in *Zaomma*, only about twice as broad as the funicle, but as long or nearly; funicle joints transverse, the first two or three smaller than the others, submoniliform; pedicel rather large; scape short, subclavate or slightly thickened toward apex. Wings hyaline, but with the venation quite different from that of *Zaomma*, the postmarginal and stigmal veins being much shorter than in that genus.

The male, or what I take to be the male, has the flagellum filiform, tapering off at tip, with the joints a little longer than thick, and clothed with a very short, fine pubescence.

1. ADELENCYRTUS CHIONASPIDIS Howard.

Encyrtus chionaspidis HOWARD, Proc. U. S. Nat. Mus., XVIII, 1896, p. 637, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 256.

Type.—Cat. No. 3253, U.S.N.M.
Habitat.—Ceylon.
Host.—Rhynch.: *Chionaspis graminis* Green.

2. ADELENCYRTUS PLANCHONIÆ Howard.

Encyrtus planchoniæ HOWARD, Proc. U. S. Nat. Mus., XVIII, 1896, p. 637, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 262.

Type.—Cat. No. 3253, U.S.N.M.
Habitat.—Ceylon.
Host.—Rhynch.: *Planchonia delicata* Green.

3. ADELENCYRTUS SOLIDUS Howard.

Encyrtus solidus HOWARD, Proc. U. S. Nat. Mus., XVIII, 1896, p. 638, male.—DALLA TORRE, Cat. Hym., V, 1898, p. 263.

Type.—Cat. No. 3256, U.S.N.M.
Habitat.—Ceylon.
Host.—Rhynch.: *Eriococcus rhodomyrti* Green.

75. CALLIPTEROMA Motschulsky.

1863. *Callipteroma* MOTSCHULSKY, Bull. Soc. Natur. Moscow, XXXVI (2), p. 35.
1898. *Calliopteroma* DALLA TORRE, Cat. Hym., IV, p. 307.

(Type, *Callipteroma 5-guttata* Motschulsky.)

1. CALLIPTEROMA QUINQUEGUTTATA Motschulsky.

Callipteroma 5-guttata MOTSCHULSKY, Bull. Soc. Natur. Moscow, XXXVI, 1863, p. 36, pl. II, fig. 5.
Calliopteroma 5-guttata, DALLA TORRE, Cat. Hym., IV, p. 307.

Habitat.—Ceylon.

2. CALLIPTEROMA SEXGUTATA Motschulsky.

Callipteroma sexguttata MOTSCHULSKY, Bull. Soc. Natur. Moscow, XXXVI, 1863, p. 37.
Calliopteroma sexguttata DALLA TORRE, Cat. Hym., IV, p. 307.

Habitat.—Ceylon.

3. CALLIPTEROMA TESTACEA Motschulsky.

Callipteroma testacea MOTSCHULSKY, Bull. Soc. Natur. Moscow, XXXVI, 1863, p. 37.
Calliopteroma testacea DALLA TORRE, Cat. Hym., IV, p. 307.

Habitat.—Ceylon.

76. CERAPTEROCERUS Westwood.

1833. *Cerapterocerus* WESTWOOD, Mag. Nat. Hist., VI, p. 495.
1848. *Telegraphus* RATZEBURG, Ichn. d. Forstins., II, p. 153.

(Type, *Cerapterocerus mirabilis* Westwood.)

1. CERAPTEROCERUS FLORIDANUS Ashmead.

Cerapterocerus floridanus ASHMEAD, Tr. Am. Ent. Soc., XIV, 1887, p. 190.—DALLA TORRE, Cat. Hym., V, p. 236.

Type.—Cat. No. 1472, U.S.N.M. (Ashmead collection.)
Habitat.—Florida: Jacksonville.

2. CERAPTROCERUS LATEVITTATUS Costa.

Ceraptrocerus latevittatus COSTA, Atti accad. sc. Napoli, IX, 1882, p. 38.—DALLA TORRE, Cat. Hym., V, 1898, p. 236.

Habitat.—Europe: Sardinia.

3. CERAPTROCERUS MIRABILIS Westwood.

Ceraptrocerus mirabilis WESTWOOD, Mag. Nat. Hist., VI, 1833, p. 495 (part).—WALKER, Ent. Mag., V, 1837, p. 114.—WESTWOOD, Intro., II, 1840, Synop., p. 73.
Encyrtus mirabilicornis FÖRSTER, Beitr. Monogr. Pteromal., 1841, p. 45.
Telegraphus mirabilicornis RATZEBURG, Ichn. d. Forstins., II, 1848, pp. 152, 153; BOIE, Stettin entom. Zeitg., II, 1857, p. 194.
Ceraptrocerus mirabilis REINHARD, Berlin, entom. Zeitschr., II, 1858, p. 12.—WALKER, Notes on Chalcid., Pt. 7, 1872, p. 73; Entomologist, VI, 1872, p. 131, fig.—THOMSON, Hym. Skand., IV, 1875, p. 151.—MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1876, p. 748.—VOLLENHOVEN, Pinacogr., 1879, p. 55; pl. XXXV, figs. 4, 5.—DALLA TORRE, Cat. Hym., V, 1898, p. 236.

Habitat.—Europe: England; Germany; Austria; Sweden.

4. CERAPTROCERUS PILICORNIS Thomson.

Ceraptrocerus mirabilis WESTWOOD, Mag. Nat. Hist., VI, 1833, p. 495 (part).
Ceraptrocerus pilicornis THOMSON, Hym. Skand., IV, 1875, p. 152, female.

Habitat.—Europe: Sweden.

77. HABROLEPIS Förster.

1856. *Habrolepis* FÖRSTER, Hym. Stud., II, p. 34.

(Type, *Encyrtus dalmani* Westwood.)

1. HABROLEPIS DALMANI Westwood.

Encyrtus dalmani WESTWOOD, Phil. Mag. (3), X, 1837, p. 440.
Encyrtus nubilipennis (CURTIS) WALKER, Ent. Mag., V, 1837, p. 113, female.
Habrolepis nubilipennis FÖRSTER, Hym. Stud., II, 1856, p. 38.
Encyrtus nubilipennis SIX, Tjidschr. v. Ent., X, 1867, p. 221, pl. X, fig. *h*.

Habrolepis dalmani MAYR, Verh. Zool.-bot. Gesell. Wien, XXV, 1875, p. 751.—WACHTL, Wien. Ent. Zeitg., I, 1882, p. 298.—DALLA TORRE, Cat. Hym., V, 1898, p. 232.

Habitat.—Europe; North America; Asia.

Host.—Rhynch.: *Asterodiaspis quercicola* Bouché.

2. HABROLEPIS CYANEA Ashmead.

Comys cyanea ASHMEAD, Ent. Amer., IV, 1888, p. 17, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 239.

Type.—Cat. No. 4763, U.S.N.M. (Ashmead collection.)

Habitat.—Florida: Jacksonville.

3. HABROLEPIS ZETTERSTEDII Westwood.

Encyrtus zetterstedii WESTWOOD, Phil. Mag. (3), X, 1837, p. 440.—WALKER, Ent. Mag., V, 1837, p. 113, female.

Encyrtus dendripennis RATZEBURG, Ichn. d. Forstins., III, 1852, p. 189, female.

Encyrtus zetterstedii REINHARD, Berl. Ent. Zeitschr., II, 1858, p. 19.

Habrolepis zetterstedii MAYR, Verh. Zool.-bot. Gesell. Wien, XXV, 1875, p. 752, female.—THOMSON, Hym. Scand., IV, 1875, p. 153, female and male.

Habitat.—Europe; North America.

Host.—Rhynch.: *Aspidiotus tiliæ* Signoret.

78. HOMALOPODA Howard.

1894. *Homalopoda* HOWARD, Journ. Linn. Soc. Lond., Zool., XXV, p. 90.

(Type, *Homalopoda cristata* Howard.)

1. HOMALOPODA CRISTATA Howard.

Homalopoda cristata HOWARD, Journ. Linn. Soc. Lond., Zool., XXV, 1894, p. 91, female.—DALLA TORRE, Cat. Hym., V, p. 240.

Type.—Cat. No. 2718, U.S.N.M.

Habitat.—West Indies: St. Vincent.

Host.—Rhynch.: *Aspidiotus secretus* Cockerell.

79. EUSEMION Dahlbom.

1857. *Eusemion* DAHLBOM, Öfvers. Svensk. Vet.-Akad. Förh., XIV, p. 293.

(Type, *Encyrtus corniger* Haliday.)

1. EUSEMION LONGIPENNIS Ashmead.

Mira longipennis ASHMEAD, Ent. Amer., IV, 1888, p. 17, female.—DALLA TORRE, Cat. Hym., V, p. 237.

Type.—Cat. No. 4764, U.S.N.M. (Ashmead collection.)

Habitat.—Florida: Jacksonville.

Host.—Rhynch.: *Lecanium* sp. on oak.

80. ATROPATES Howard.

1898. *Atropates* HOWARD, Proc. U. S. Nat. Mus., XXI, p. 236.

(Type, *Atropates collinsi* Howard.)

1. ATROPATES COLLINSI Howard.

Atropates collinsi HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, p. 236, female and male.

Type.—Cat. No. 5028, U.S.N.M.

Habitat.—New York: Brooklyn, Roslyn.

Host.—Rhynch.: *Pulvinaria innumerabilis* Rathvon.

81. CHRYSOPLATYCERUS Ashmead.

1888. *Rileya* HOWARD, Can. Ent., XX, p. 148 (*nec* Ashmead).
1889. *Chrysoplatycerus* ASHMEAD, Can. Ent., XXI, p. 38.

(Type, *Rileya splendens* Howard.)

1. CHRYSOPLATYCERUS SPLENDENS Howard.

Rileya splendens (HOWARD) SMITH, Ent. Amer., 1888, p. 80 [notice of species].
Rileya splendens HOWARD, Can. Ent., XX, 1888, pp. 191–194, female, fig.—ASHMEAD, Can. Ent., XX, 1888, p. 229; XXI, 1889, p. 13.
Chrysoplatycerus splendens ASHMEAD, Can. Ent., XXI, 1889, p. 38.—DALLA TORRE, Cat. Hym., V, 1898, p. 266.

Type.—Cat. No. 1492, U.S.N.M.

Habitat.—California.

Host.—Rhynch.: *Dactylopius* sp.

2. CHRYSOPLATYCERUS HOWARDII Ashmead, new species.

Female.—Length, 1–6 mm. Ferruginous; the broadly dilated scape *above* and the broad, compressed flagellum brown-black or dark fuscous; abdomen blue-black, with an aeneous tinge; hind legs brown, the tibiæ fuscous, with the tarsi, except basal and last joints, white or whitish; wings with the apical three-fifths embrowned, the basal two-fifths clear hyaline; hair tuft on scutellum long, black.

Type.—Cat. No. 4764, U.S.N.M.; also in collection of the American Entomological Society.

Habitat.—Mexico.

Described from two female specimens received from the American Entomological Society of Philadelphia, labeled 461 and 435, and supposed to have been received from Mexico.

82. ASTEROPÆUS Howard.

1898. *Asteropæus* HOWARD, Proc. U. S. Nat. Mus., XXI, p. 232.

(Type, *Asteropæus primus* Howard.)

1. ASTEROPÆUS PRIMUS Howard.

Asteropæus primus HOWARD, Proc. U. S. Nat. Mus., XXI, p. 231, female.

Type.—Cat. No. 5021, U.S.N.M.

Habitat.—Mexico: Guaymas.

Host.—Rhynch.: *Ceroplastes* sp.

83. ANICETUS Howard.

1896. *Anicetus* HOWARD, Proc. U. S. Nat. Mus., XVIII, p. 639.

(Type, *Anicetus ceylonensis* Howard.)

1. ANICETUS CEYLONENSIS Howard.

Anicetus ceylonensis HOWARD, Proc. U. S. Nat. Mus., XVIII, 1896, p. 639, female.

Type.—Cat. No. 3258, U.S.N.M.

Habitat.—Ceylon.

Host.—Rhynch.: *Vinsonia stellifera* Westwood.

84. ZARHOPALUS Ashmead, new genus.

(Type, *Zarhopalus sheldoni* Ashmead.)

Head antero-posteriorly thick, with some sparse punctures above, the scrobes deep semicircular, but not bounded by a carina superiorly. Ocelli arranged in a triangle, the lateral ocelli touching the eye margin. Eyes large oval, sparsely hairy. Antennæ short, stout, the scape dilated beneath toward apex, the flagellum strongly incrassated, subcompressed, and hardly longer than the scape; the pedicel is long, longer than the first 3 joints of funicle united, the latter being annular. Front wings fuliginous, the marginal vein punctiform, the stigmal and postmarginal veins very long, as in *Encyrtus* (*Comys*).

1. ZARHOPALUS SHELDONI Ashmead, new species.

Female.—Length, 1.2 mm. Black, submetallic, and highly polished; tarsi, except last joint, white or pale yellowish white.

The mesonotum is a little shorter than the scutellum, and with the latter highly polished and impunctate; the wings are fuliginous, but paler at basal third, the veins black; while the abdomen is oval, not longer than the thorax.

Type.—Cat. No. 4766, U.S.N.M. (Ashmead collection.)

Habitat.—Lake Placid, New York (Charles Sheldon); Bladensburg, Maryland (E. A. Schwarz).

2. ZARHOPALUS INQUISITOR Howard.

Encyrtus inquisitor HOWARD, Rep. U. S. Dept. Agric., 1880–81, p. 367, female.—CRESSON, Syn. Hym. N. A., p. 239.—DALLA TORRE, Cat. Hym., V, 1898, p. 260.

Type.—Cat. No. 2616, U.S.N.M.

Habitat.—Florida.

Host.—Rhynch.: *Dactylopius destructor* Comstock.

3. ZARHOPALUS CRASSUS Howard.

Encyrtus crassus HOWARD, Journ. Linn. Soc. Lond., Zool., XXVI, 1894, p. 93, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 257.

Type in British Museum.

Habitat.—West Indies: St. Vincent.

4. (?) ZARHOPALUS QUADRICOLOR Howard.

Encyrtus quadricolor HOWARD, Journ. Linn. Soc. Lond., Zool., XXV, 1894, p. 93, male.—DALLA TORRE, Cat. Hym., V, 1898, p. 262.

Habitat.—West Indies: St. Vincent.

85. METALLON Walker.

1848. *Metallon* WALKER, List Chalc. Brit. Mus., II, p. 219.
1856. *Rhopus* FÖRSTER, Hym. Stud , II, p. 34.
1875. *Technites* THOMSON, Hym. Skand., IV, p. 118.
1880. *Acerophagus* SMITH (EMILY), N. Am. Entom., I, p. 83 (*teste* Howard).

(Type, *Metallon acacallis* Walker.)

1. METALLON ACACALLIS Walker.

Metallon acacallis WALKER, List Chalc. Brit. Mus., II, 1848, p. 220, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 236.

Habitat.—England.

2. METALLON ATRICEPS Walker.

Metallon atriceps WALKER, Notes on Chalc., Pt. 7, 1872, p. 115, male.—DALLA TORRE, Cat. Hym., V, 1898, p. 236.

Habitat.—Africa: Madeira.

3. METALLON COCCOIS Smith (Emily).

Acerophagus coccois SMITH (EMILY), N. A. Entom., I, 1880, p. 83, pl. VI, figs. 20–23.
Rhopus coccois HOWARD, Rep. U. S. Dept. Agric., 1880–81, p. 361, pl. XXIV, fig. 2.—CRESSON, Syn. Hym. N. A., 1887, p. 238.—DALLA TORRE, Cat. Hym., V, 1898, p. 232.

Cotype.—Cat. No. 1470, U.S.N.M.
Habitat.—Illinois; Pennsylvania.
Host.—Rhynch.: *Pseudococcus aceris* Signoret.

4. METALLON DEBILIS Förster.

Rhopus debilis FÖRSTER, Progr. Realsch. Aachen, 1861, p. xxxiii, male.—DALLA TORRE, Jahresber. naturf. Ges. Graubunden, XXVIII, 1885, p. 61; Cat. Hym., V, 1898, p. 232.

Habitat.—Europe: Switzerland.

5. METALLON FUSCITARSIS Thomson.

Metallon fuscitarsis THOMSON, Hym. Skand., IV, 1875, p. 169, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 236.

Habitat.—Europe: Sweden.

6. METALLON INFUSCATUS Förster.

Rhopus infuscatus FÖRSTER, Progr. Realsch. Aachen, 1861, p. xxxiii, male.—DALLA TORRE, Jahresber. naturf. Ges. Graubunden, XXVIII, 1885, p. 61; Cat. Hym., V, 1898, p. 232.

Habitat.—Europe: Switzerland.

7. METALLON TESTACEOUS Ratzeburg.

?Encyrtus piso WALKER, Ent. Mag., V, 1838, p. 423, male.
Encyrtus testaceus RATZEBURG, Ichn. d. Forstins., II, 1848, p. 146; III, 1852, p. 190.
Rhopus piso FÖRSTER, Hym. Stud., II, 1856, p. 37.
Rhopus testaceus MAYR, Verh. Zool.-bot. Ges. Wien, XXV, 1875, p. 691, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 232.

Habitat.—Europe.
Host.—Rhynch.: *Physokermes abietis* Modeer.

86. CERCOBELUS Walker.

1837. *Cercobelus* WALKER, Ent. Mag., V, p. 48.

(Type, *Cercobelus jugæus* Walker.)

1. CERCOBELUS JUGÆUS Walker.

Encyrtus (Cercobelus) jugæus WALKER, Ent. Mag., V, 1837, p. 48, female; Entomologist, 1841, pl. N, fig. 1.

Cercobelus jugæus FÖRSTER, Hym. Stud., II, 1856, p. 36.—WALKER, Notes on Chalcid, Pt. 5, 1872, p. 73, fig.—THOMSON, Hym. Skand., IV, 1875, p. 171, female.—DALLA TORRE, Cat. Hym., V, 1898, p. 231.

Habitat.—Europe.

87. COCCOBIUS Ratzeburg.

1852. *Coccobius* RATZEBURG (part), Ichn. d. Forstins., III, p. 195.

(Type?)

Ratzeburg, in his original description of this genus, as has been shown by Dr. Howard, confused with it a number of species belonging to *Aphelinus* or allied genera; but, nevertheless, he must have had before him at least one genuine Encyrtine, as his figure, both of venation and antenna, clearly shows; and I here restore the name for a species agreeing in all particulars with his brief diagnosis and his figure. No Aphelinine has a wing-venation as figured by Ratzeburg.

1. COCCOBIUS DIASPIDIS Ashmead, new species.

Female.—Length, 0.3 mm. Polished black; scape and legs pale yellow, the clavate 5-jointed flagellum, light brown; wings hyaline, the marginal vein punctiform, the post-marginal vein entirely wanting, the stigmal vein very minute, represented by a subpetiolated dot.

Type.—Cat. No. 5084, U.S.N.M.

Habitat.—Washington.

Host.—Rhynch.: *Diaspis rosæ* Bouché.

Described from two specimens reared at the Department of Agriculture May 18, 1895, from *Diaspis rosæ* Bouché.

Tribe IV. ARRHENOPHAGINI.

88. RHOPOIDEUS Howard.

1898. *Rhopoideus* HOWARD, Proc. U. S. Nat. Mus., XXI, p. 235.

(Type, *Rhopoideus citrinus* Howard.)

1. RHOPOIDEUS CITRINUS Howard.

Rhopoideus citrinus HOWARD, Proc. U. S. Nat. Mus., XXI, 1898, p. 235, female.

Type.—Cat. No. 5027, U.S.N.M.

Habitat.—California: Truckee.

Host.—? Lepid.: Tortricid; Rhynch.: *Aspidiotus perniciosus* Comstock.

89. ARRHENOPHAGUS Aurivillius.

1888. *Arrhenophagus* AURIVILLIUS, Ent. Tidskr., IX, p. 144.

(Type, *Arrhenophagus chionaspidis* Aurivillius.)

1. ARRHENOPHAGUS CHIONASPIDIS Aurivillius.

Arrhenophagus chionaspidis AURIVILLIUS, Ent. Tidskr., IX, 1888, p. 146, pl. 1, figs. 1-9.—DALLA TORRE, Cat. Hym., V, 1898, p. 266.—HOWARD, Proc. Ent. Soc. Wash., IV, 1898, p. 135, fig. 9, male and female antennæ.

Co-type.—Cat. No. 4854, U.S.N.M. (Chris. Aurivillius collection.)

Habitat.—Europe; North America; Asia; Ceylon; Australia.

Host.—Rhynch.: *Chionaspis salicis* Signoret, *C. eugeniæ* Maskell, *Diaspis rosæ* Bouché, *D. ostreæformis* Signoret, *Fiorinia saprosmæ* Green, *Aspidiotus nerii* Bouché.

Subfamily III. SIGNIPHORINÆ.

90. SIGNIPHORA Ashmead.

1880. *Signiphora* ASHMEAD, Orange Insects, 1880, p. 30.
1894. *Signiphora* HOWARD, Insect Life, VI, p. 233.

(Type, *Signiphora flavopalliata* Ashmead.)

TABLE OF SPECIES.

Body *not* wholly black 2
Body wholly black or blue-black.
Wings fuliginous on basal half; all tarsi white, the middle and anterior tibiæ brown, rest of legs black.....(1) *S. nigra* Ashmead, new species.
Wings fuscous with a hyaline band across the middle; legs black, a dot on knees and the tarsi whitish.....(2) *S. australiensis* Ashmead, new species.
Wings hyaline, with a fuscous band across the middle; tarsi alone white.
(3) *S. dactylopii* Ashmead, new species.
Wings entirely hyaline; all tarsi white...(4) *S. noacki* Ashmead, new species.
2. Head, thorax, and most of the abdomen yellow..... 4
Head anteriorly and a broad band between the wings ivory white..... 3
Thorax black, with a single narrow yellowish-white band across the base of the scutellum and continued at sides along the posterior margin of the mesopleura and the mesosternal suture; wings hyaline.
(5) *S. unifasciata* Ashmead, new species.
Thorax black, with two transverse narrow bands between the tegulæ; wings hyaline.....(6) *S. bifasciata* Ashmead, new species.
Head and abdomen blue-black; thorax, except the pronotum, bright yellow; wings hyaline with a dusky band beneath the marginal vein.
(7) *S. flavopalliata* Ashmead.
Head and thorax mostly brown.
Mesonotum lemon-yellow; abdomen brown-black; wings hyaline, with a broad fuscous band beneath the marginal vein.....(8) *S. occidentalis* Howard.
Mesonotum brown, the lateral margins narrowly yellow; abdomen æneous black; wings clear hyaline.....(9) *S. mexicana* Ashmead, new species.
3. Head anteriorly, a broad band between wings including the metathorax, and sutures between abdominal segments, ivory white; wings hyaline with a discoidal cloud beneath the marginal vein.
(10) *S. rhizococci* Ashmead, new species.
4. Body mostly yellow; thorax at anterior apex, band across base of abdomen, ovipositor, and band across middle of front wings dark brown.
Band at base of abdomen narrower, including hardly one-third of its length; club of antennæ entirely yellow.....(11) *S. aleyrodis* Ashmead, new species.
Band at base of abdomen including more than one-third of its length; club wholly yellow; no distinct band between the eyes.
(12) *S. coquilletti* Ashmead, new species.

Club of antennæ with its apical half brown.

(13) *S. aspidioti* Ashmead, new species.

Band at base of abdomen including more than one-half of the abdomen, sometimes with only the tip yellow; club of antennæ shorter and wholly yellow.

(14) *S. townsendi* Ashmead, new species.

1. SIGNIPHORA NIGRA Ashmead, new species.

Female.—Length, about 0.55 mm. Polished black impunctate, but with a decided aeneous tinge in certain lights. Flagellum brown-black. Legs black, the anterior and middle tibiæ brownish, their tips and all tarsi white. Wings with the basal half or more fuliginous, the apical half or less hyaline.

Type.—Cat. No. 4767, U.S.N.M. (Ashmead collection.)

Habitat.—District of Columbia: Washington.

2. SIGNIPHORA AUSTRALIENSIS Ashmead, new species.

Female.—Length, 0.60 mm. Aeneous black, the mesonotum with a bronzy tinge, the scutellum with a slight bluish tinge; legs black, a spot on knees and tarsi white or yellowish-white, the anterior tibiæ yellowish beneath; wings fuscous with a hyaline band across the disk from apex of the marginal vein.

Type.—Cat. No. 4771, U.S.N.M.

Habitat.—Australia. (Albert Koebele, collector.)

Host.—Rhynch.: Sp. not identified.

3. SIGNIPHORA DACTYLOPII Ashmead, new species.

Female.—Length, 0.58 mm. Blue-black, the mesonotum with an aeneous tinge anteriorly; legs concolorous with the body, except the tarsi, which are white; wings hyaline, with a fuscous band across the middle from beneath marginal vein to the hind margin.

Type.—Cat. No. 4772, U.S.N.M.

Habitat.—District of Columbia.

Host.—Rhynch.: *Dactylopius ephedræ* Coquillett. Bred at Department of Agriculture.

4. SIGNIPHORA NOACKI Ashmead, new species.

Female.—Length, 0.50 mm. Coal-black, except a whitish line on the hind margin of the mesopleura, along the suture separating it from the metapleura and the tarsi, which are white; wings wholly hyaline.

Type.—Cat. No. 4773, U.S.N.M.

Habitat.—Brazil: San Paulo. (F. Noack.)

Host.—Rhynch.: *Psylla* sp. on a wild shrub. Bred October, 1897, by F. Noack.

5. SIGNIPHORA UNIFASCIATA Ashmead, new species.

Female.—Length, about 0.70 mm. Black, with a narrow yellowish-white band across base of scutellum and continued below on the hind margin of the mesopleura and along the mesosternal suture; tarsi white; wings hyaline.

Type.—Cat. No. 4774, U.S.N.M.

Habitat.—Florida: Georgiana. (Dr. Wittfield.)
Host.—Rhynch.: *Ceropsylla sideroxyli* Riley.

6. SIGNIPHORA BIFASCIATA Ashmead, new species.

Female.—Length, about 0.60 mm. Black, with two transverse yellow bands on thorax above between the tegulæ, or on the hind border of the mesonotum, the other at the base of the scutellum, the latter also continued along the mesopleural suture; legs black or blackish, the knees yellowish, the tarsi whitish; wings hyaline.

Type.—Cat. No. 4775, U.S.N.M.
Habitat.—West Indies: St. Vincent. (H. H. Smith.)

7. SIGNIPHORA FLAVOPALLIATA Ashmead.

Signiphora flavopalliata ASHMEAD, Orange Insects, 1880, p. 30.—HOWARD, Rep. U. S. Dept. Agric., 1880–81, p. 371; Ins. Life, VI, 1894, p. 235.—DALLA TORRE, Cat. Hym., V, 1898, p. 217.

Type.—Cat. No. 2801, U.S.N.M. (Ashmead collection.)
Habitat.—Florida.
Host.—Rhynch.: *Aspidiotus citricola* Packard, *A. cydoniæ* Comstock, *Mytilaspis gloverii* Packard, *Aleyrodes* sp.

8. SIGNIPHORA OCCIDENTALIS Howard.

Signiphora occidentalis HOWARD, Ins. Life, VI, 1894, p. 233, fig. 12, female and male.—DALLA TORRE, Cat. Hym., V, 1898, p. 217.

Type.—Cat. No. 1473, U.S.N.M.
Habitat.—California: San Gabriel.
Host.—Rhynch.: *Aspidiotus aurantii* var. *citrinus* Coquillett.

9. SIGNIPHORA MEXICANA Ashmead, new species.

Female.—Length, about 0.45 mm. Head, thorax, antennæ, and legs, except tarsi, brownish-yellow; abdomen æneous black; tarsi white; mesonotum margined with yellow at sides; wings hyaline.

Type.—Cat. No. 4776, U.S.N.M.
Habitat.—Mexico: San Luis.
Host.—Rhynch.: *Aspidiotus nerii* Bouché. (Tyler Townsend.)

10. SIGNIPHORA RHIZOCOCCI Ashmead, new species.

Female.—Length, about 0.50 mm. Head anteriorly, a broad band on thorax between the wings and the sutures between abdominal segments, more or less, ivory white; club of antennæ and vertex faintly dusky; anterior orbits narrowly, rest of body and a broad band on middle of front wings, dark brown.

Type.—Cat. No. 4858, U.S.N.M.
Habitat.—Brazil: Minas Geras.
Host.—Rhynch.: *Rhizococcus* sp. on a composite plant. Bred by F. Noack, July, 1897. One specimen.

11. SIGNIPHORA ALEYRODIS Ashmead, new species.

Female.—Length, about 0.50 mm. Body mostly golden-yellow; vertex of head faintly dusky; thorax anteriorly and very narrowly, and a band across base of abdomen including hardly one-third its length, dark brown; wings hyaline, with a dusky band across the middle just beneath the marginal vein, which is a little narrower at the hind margin than at its origin; antennæ and legs entirely pale yellowish white.

Type.—Cat. No. 4855, U.S.N.M.

Habitat.—West Indies: Trinidad.

Host.—Rhynch.: *Aleyrodes* sp. on orange. Two specimens, Acc. No. 6162, Department of Agriculture.

12. SIGNIPHORA COQUILLETTI Ashmead, new species.

Female.—Length, hardly 0.50 mm. Bright golden-yellow; vertex of head fuscous; thorax *entirely*, and abdomen, except a dark brown band at base which occupies fully one-third or more of its length, yellow; otherwise as in *Aleyrodis*.

Type.—Cat. No. 4857, U.S.N.M.

Habitat.—Rhynch.: *Aleyrodes* sp. on *Quercus agrifolia*.

Easily distinguished from *S. aleyrodis* by the fuscous vertex and the absence of the brown blotch on the anterior part of the thorax.

13. SIGNIPHORA ASPIDIOTI Ashmead, new species.

Female.—Length, about 0.50 mm. Lemon or golden-yellow; head faintly dusky above; apical half of antennal club, anterior half of the mesonotum, and a broad transverse band at base of abdomen, including nearly half its length, dark brown; wings with a broad fuscous band, as in previous species.

Type.—Cat. No. 4859, U.S.N.M.

Habitat.—Mexico: San Louis.

Host.—Rhynch.: *Aspidiotus nerii* Bouché. Bred November, 1894, by Tyler Townsend.

14. SIGNIPHORA TOWNSENDI Ashmead, new species.

Female.—Length, about 0.45 mm. Mostly dark-brown; a broad band between the wings including the hind margin of the mesonotum, scutellums, and metathorax, and the apical third of abdomen, or less, lemon-yellow. Wings hyaline, as in previous species, but the fuscous band has a deep median hyaline emargination on its basal margin. Antennæ and legs pale yellowish, the club rather short, about one-third shorter than in the other species.

Type.—Cat. No. 4856, U.S.N.M.

Habitat.—Mexico: Tabasco.

Host.—Rhynch.: *Aleyrodes* sp. on a coarse grass. Bred by Tyler Townsend, June 19, 1897. Four specimens.

A HUNDRED NEW MOTHS OF THE FAMILY NOCTUIDÆ.

By JOHN B. SMITH, Sc. D.,
Rutgers College, New Brunswick, New Jersey.

Among the specimens sent me by correspondents for determination from time to time there is always a little residue that can not be certainly named. The material is for some reason or other not sufficient, or not satisfactory enough to make it safe to say that a new species is at hand, and the specimens are placed with their nearest allies, awaiting mates. The mere description of species is not to me an agreeable task, and so, gradually, specimens have accumulated until it seems necessary to put them into their proper places to facilitate future recognition. In the descriptions presented herewith the source of the specimens is acknowledged in almost every instance. Where it is not done, it is because accurate data no longer exist. With few exceptions, the types of the species are now or will be deposited in the U. S. National Museum. The exceptions are principally of specimens belonging to other institutions, or where I could not dispose of the specimens according to my own inclinations. There are a few notes on other species; but the paper, as a whole, is intended to be descriptive.

LIST OF SPECIES DESCRIBED.

1. *Arsilonche colorada.*
2. *Chytonix semifascia.*
3. *Copibryophila angelica.*
4. *Setagrotis quebecensis.*
5. *Setagrotis radiatus.*
6. *Carneades pugionis.*
7. *Carneades nevada.*
8. *Carneades contagionis.*
9. *Carneades loya.*
10. *Carneades flaviscapula.*
11. *Carneades excogita.*
12. *Carneades exculta.*
13. *Carneades nævulus.*
14. *Carneades megastigma.*
15. *Carneades stigmatalis.*
16. *Carneades termessus.*
17. *Carneades enteridis.*
18. *Carneades atropulverea.*
19. *Carneades compressipennis.*
20. *Carneades falerina.*
21. *Carneades callus.*
22. *Carneades sessile.*
23. *Carneades relaxus.*
24. *Carneades luteositus.*
25. *Carneades tocoyæ.*
26. *Carneades incubita.*
27. *Carneades terrenus.*
28. *Carneades territorialis.*
29. *Carneades fulda.*
30. *Carneades itodes.*
31. *Carneades lagganæ.*
32. *Carneades ontario.*
33. *Carneades testula.*
34. *Carneades difformis.*
35. *Carneades dakota.*
36. *Carneades holoberba.*

37. *Carneades kerrvillei.*
38. *Carneades ternarius.*
39. *Carneades noctuiformis.*
40. *Carneades intrusa.*
41. *Carneades neotelis.*
42. *Carneades atrofusca.*
43. *Carneades objurgata.*
44. *Carneades cariosus.*
45. *Carneades malis.*
46. *Carneades pindar.*
47. *Carneades henrietta.*
48. *Carneades vanidicus.*
49. *Carneades faminalis.*
50. *Carneades nordica.*
51. *Carneades factoris.*
52. *Carneades cæsius.*
53. *Carneades acutifrons.*
54. *Carneades selenis.*
55. *Carneades laminis.*
56. *Anytus atristrigatus.*
57. *Mamestra senatoria.*
58. *Mamestra rainierii.*
59. *Mamestra bolteri.*
60. *Mamestra yakima.*
61. *Mamestra dilatata.*
62. *Mamestra florida.*
63. *Mamestra roseosuffusa.*
64. *Mamestra griseata.*
65. *Hadena tapeta.*
66. *Hadena luteocinerea.*
67. *Hadena mustelina.*
68. *Hadena jocasta.*
69. *Hadena tela.*
70. *Polia extincta.*
71. *Polia acera.*
72. *Polia dispar.*
73. *Polia ochracea.*
74. *Perigea lucetta.*
75. *Perigea cervina.*
76. *Perigea texana.*
77. *Perigea consors.*
78. *Caradrina leucorena.*
79. *Homohadena candida.*
80. *Oncocnemis ciliata.*
81. *Trichopolia serrata.*
82. *Leucania velutina.*
83. *Himella quadristigma.*
84. *Selicanis cinereola.*
85. *Anepischetos bipartita.*
86. *Diallagma lutea.*
87. *Heliodes angelica.*
88. *Heliodes restrictalis.*
89. *Narthecophora pulverea.*
90. *Palada scarletina.*
91. *Schinia reniformis.*
92. *Schinia oculata.*
93. *Schinia ciliata.*
94. *Tripudia balteata.*
95. *Tripudia luxuriosa.*
96. *Parora texana.*
97. *Synedoida subtermina.*
98. *Antiblemma minorata.*
99. *Antiblemma fasciata.*
100. *Bomolocha vega.*

1. ARSILONCHE COLORADA, new species.

Ground color a rather pale reddish luteous, somewhat sparsely powdered with black scales. On the thorax these scales tend to form a submarginal line. On the primaries they form a very obscure little dot at the lower angle of the cell and vague streaks in the interspaces, the veins being narrowly white marked. The indication is that the streaks in the interspaces of the median and submedian series may become well marked, but in the two examples before me there are no contrasts. Secondaries more whitish, a vague marginal shading, else immaculate. Beneath somewhat paler, disk of primaries somewhat smoky, else immaculate.

Expanse, 31 to 33 mm. = 1.24 to 1.32 inches.

Habitat.—Glenwood Springs, Colorado; September, Dr. Barnes.

Two females, who have for some years been awaiting a mate. The species is now described because it is not easy to mistake it, and it differs obviously from our eastern form in the smaller size and more dull, reddish luteous coloring.

Incidentally, it may be said that it is probable that Mr. Grote's name

henrici may have to be reinstated for the eastern form usually named *albovenosa*. It seems that there is a small, though constant, difference in the male sexual parts, which is not accompanied by any noticeable superficial differences and seems not to be accompanied by any larval differences obvious to Dr. Dyar.

2. CHYTONIX SEMIFASCIA, new species.

Ground color a somewhat smoky brown, variously powdered. Head without obvious markings, collar with a black tip, disk of the thorax pure white, in strong contrast with the rest of the markings. Edge of the patagia blackish; the scales of the posterior tuft brown tipped. Primaries with the upper half of the wings smoky brown, the lower half blackish brown, the shades merging gradually. The markings are all obscure and are traceable with difficulty. The basal line is marked on the costa only and never distinctly. The transverse anterior line is geminate, but the outer line only is obvious. In course it is usually oblique, with the usual outcurve below the median vein. Transverse posterior line geminate, both parts of it almost equally indistinct, the inner perhaps a little the better marked. The defining lines are very even, but the line as a whole is almost rectangularly bent over the cell and then incurved below. The subterminal line is scarcely marked above the middle except by a blackish dash near the apex. Below the middle it is traceable as a gray or whitish shading through the dusky part of the wing. There is a smoky terminal line, beyond which there is a pale line at the base of the fringes, which are interlined with blackish and cut with brown on the veins. The ordinary spots are vaguely indicated, outlined by very slightly darker brown shadings. There is a distinct black basal dash, which reaches the transverse anterior line, and beyond it is the small, loop-like claviform, which is defined in a pure white patch which fills the median space between the median lines and extends upward to the median vein. Through this white patch some specimens show the remnant of a median shade. Beyond the transverse posterior line a blackish shade forms the continuation of the basal line and reaches the subterminal line. Above this there is a little black sagittate mark. Toward the apex there is a brown shading which is broad on the margin and narrows toward the subterminal line. Secondaries yellowish white, a little silky in appearance, with a blackish line at the base of the fringes as well as a vague small discal lunule. Beneath powdery, yellowish white, both wings with a discal lunule.

Expanse, 25 to 29 mm. = 1 to 1.15 inches.

Habitat.—Glenwood Springs, Colorado, in July; Garfield County, Colorado, 6,000 feet.

Type.—Cat. No. 4147, U.S.N.M.

This pretty little species has been taken by Mr. Bruce and also by Dr. Barnes; both sexes being before me. It is a sharply marked form,

easily distinguished by the white thoracic disk and the prominent white spots on the inner margin, filling the median space at that point. It forms almost a half band of white, but does not quite reach the middle of the wing. When the specimen is spread the three white spots centering in the thorax give the creature a very characteristic appearance. Perhaps the insect would be a little better referred to *Bryophila;* but it is nearer in general appearance to the species of *Chytonix*, while not so broad winged.

COPIBRYOPHILA, new genus.

Eyes naked, large, hemispherical. Head moderate in size, distinct, not at all retracted, front conical and produced into a flat, wedge-shaped process which terminates in a broad, chisel-like tip. Vestiture scaly, forming no obvious tuftings. Palpi slender, cylindrical, reaching to or projecting a little beyond the frontal process. Antennæ simple in both sexes. Thorax rather short, subglobular, vestiture scaly, forming no obvious tufts, though there is a posterior bunching; patagia evident, though not uplifted. Abdomen reaching to or a little exceeding the anal angle of secondaries; slender, smoothly scaled. Legs well developed, tibiæ not spinose, the anterior not armed at tip, spurs of the middle and posterior tibiæ long and prominent. Vestiture of under side scaly. Wings large; primaries long and proportionately somewhat narrow, the venation apparently normal; secondaries large and broad, veins 3 and 4, separating unusually close to the tip, vein 5 scarcely even traceable.

This is a curious genus for the Bryophilid series to which I feel compelled to refer it. Its narrow primaries and ample secondaries remind one of *Hadenella*, while the conic, armed front suggests the Acontiid series. The smooth scaly vestiture and the almost complete loss of vein 5 of the secondaries are considered Bryophilid, and as determining the location of the genus.

3. COPIBRYOPHILA ANGELICA, new species.

Ground color a smooth glistening gray brown, more or less mingled with whitish scales. Head and thorax without obvious markings. Primaries with all the markings fairly well defined. The median space darker than the rest of the wing, so that it seems a little contrasting. Basal line geminate, black marked on the costa only, within it the base brown. From that point to the transverse anterior line the basal space becomes paler and whitish at the transverse anterior line. This latter line is geminate, the outer portion blackish, oblique, rather feebly sinuate, the inner line indicated by a few brown scales. Transverse posterior line geminate, not very well defined, irregular over the cell, where it is well curved outwardly, incurved beneath that point and a little better marked by the greater contrast between the median and subterminal spaces. Subterminal line irregular, whitish, without defi-

nite margins, variably emphasized by preceding and following dusky shades. The terminal space is almost all dusky. The smoky shades in the subterminal spaces are broken and become lost toward the base of the wing. There is a series of blackish terminal dots in the interspaces. The fringes are a little mottled with gray. The median shade line is distinct on the costa, darkens the space between the ordinary spots to almost blackish and becomes lost below that point. The claviform is of moderate size, outlined by black scales and filled with blackish. Orbicular round, rather small, not very well defined; its outline formed by white scales. Reniform kidney-shaped, of moderate size, outlined and partly followed by white scales, center with a dusky lunule which varies in size. Beyond the reniform the median space is paler and of the same shade as most of the subterminal space. Secondaries even, smoky, fuscous a little glistening. Beneath smoky, more or less powdery, particularly on the secondaries on which there is a more or less distinct extra median line and a discal spot. In some cases similar spots are found on the primaries as well.

Expanse, 20 to 23 mm. = 0.80 to 0.90 inches.

Habitat.—Los Angeles, California, in October.

Seven examples collected by Mr. Coquillett are under examination. There is not much difference in the specimens, except that some may be a little more contrasting than others. In some cases the median space is quite sharply defined and evenly brown, while in other cases the smoky powdering extends into the paler parts of the wing and lessens the contrast perceptibly.

Type.—Cat. No. 4813, U.S.N.M.

4. SETAGROTIS QUEBECENSIS, new species.

Ground color pale, dirty, fuscous gray, powdery. Head and thorax concolorous, vestiture mixed scales and hair, tuftings not evident, patagia not marked. Primaries with the markings so obscure as to be traceable only with some difficulty, the lines only a little darker than ground. Basal line marked only on costa and below median vein. Transverse anterior line almost upright, single, a little outcurved in the interspaces. Transverse posterior line single, crenulate, the venular points long; moderately curved over the cell, distinctly drawn in below. Subterminal line marked by a white powdering which is fairly well limited inwardly but extends irregularly into the terminal space. A very faint trace of a median shade which darkens the outer portion of the median space a mere trifle. Orbicular moderate, oval, decumbent, a trifle paler than the ground and not otherwise defined. Reniform large, kidney-shaped, a trifle darker in shade, edged with a few gray scales. Secondaries smoky, paler, with a faint yellowish tint at base, fringes white. Beneath gray, powdery, primaries darker with a somewhat obscure discal spot and outer line; secondaries paler, with line and spot both prominent.

Expanse, 33 mm. = 1.32 inches.

Habitat.—Quebec, Canada.

A single female, very like *Carneades dissona* in superficial appearance, and mistaken for it when first received. The generic reference in the absence of a male is not certain; but it is not likely that the discovery of that sex will necessitate a change.

5. SETAGROTIS RADIATUS, new species.

Ground color smoky gray, marked and irrorate with white, smoky brown and black. Head inferiorly yellowish, interantennal tuft also pale inferiorly. Palpi dusky at the sides. Collar inferiorly luteous, tipped with white and black scales. Thoracic tuftings well marked, tipped with white. Patagia white edged and with a black submarginal line. Primaries with the median lines obsolete, the subterminal line indicated by the darker terminal space and by a series of interspaceal black spots which show it to be very irregular. The veins are dusky, margined on each side by white scales, and the interspaces are dusky, the cell being darkest. There is a slender black basal streak which reaches nearly to the middle of the wing. The median vein is most prominently white marked and after this 3, 4, 6 and 7, which strongly indent the terminal space. The orbicular is obsolete. The reniform is a small, white lunule at the end of the cell. Secondaries white, with a smoky terminal line. Beneath white, powdery, else immaculate, the secondaries a little darker.

Expanse, 35 to 36 mm. = 1.40 to 1.44 inches.

Habitat.—Nevada.

Two males, very much alike, from Mrs. F. O. Herring, in only fair condition. The species is allied to *vernilis* and *infimatis* in type of maculation, but is not in the least like them in detail. It has so close a habital resemblance to *Carneades nevada*, however, that I had associated the two until a critical examination was made preparatory to description.

Type.—Cat. No. 4787, U.S.N.M.

CARNEADES Grote.

In my Revision of the Agrotids[1] I recognized 108 species as referable to *Carneades*. Three years later, after having compared the British Museum collections, I catalogued[2] 109 names under that heading. Since that time between fifteen and twenty new forms have been described, chiefly by myself, making about 125 nominal species of *Carneades*. The genus is one of the most difficult and unsatisfactory in the Noctuidæ because of the extent of the variation in certain species, and of the tendency to develop local types. In other words, species are forming

[1] Bulletin No. 38, U. S. Nat. Mus., 1890.

[2] Bulletin No. 44, U. S. Nat. Mus., 1893.

in a genus which seems peculiarly well adapted to the present conditions, and therefore dominant. Superficial differences are small at best, and, with only a small number of examples at hand, it is often simply impossible to say whether we have a mere variation or a distinct type.

Gradually my collection has become filled with doubtful forms, each lot received yielding some specimen a little unlike any other in my possession. Of recent years Prof. C. V. Piper, of Pullman, Washington, has sent me long series of the common types in his region; Dr. William Barnes, of Decatur, Illinois, has sent me series taken at Glenwood Springs, Colorado; Mr. A. W. Hanham, of Winnipeg, Manitoba, has sent me material from that section, and Mr. F. H. Wolley Dod has sent me many examples from Calgary. Other collectors have contributed to a less extent, and I have rearranged the species, recognizing no less than 50 as worthy of new names. This brings the number of known forms to 175, and the end is not yet. I have yet more than a dozen uniques, different from each other and apparently from any of the old or newly described species; but because they are defective or are females, I have not felt justified in giving them names at present.

6. CARNEADES PUGIONIS, new species.

Ground color luteous, shaded with yellow and smoky fuscous. Head smoky, palpi yellow in front, and sometimes the head immediately behind them is of the same tint. Collar bright yellow at base, smoky fuscous above, the two shades divided by a narrow black line. Thorax squared, patagia relieved, margined with gray or yellowish, submargin blackish, disc gray, tuftings evident and gray or yellow tipped. Primaries contrastingly marked with yellow, gray, and smoky brown or blackish. Costal region bright yellow at base, gradually becoming more whitish toward the transverse posterior line. Inner margin below vein 1 yellow, shading to gray. A yellow shade begins above the claviform in the submedian interspace, and extends through it into the subterminal space. The subterminal space is gray or yellow beyond the transverse posterior line, sending rays or daggers through the terminal space to the outer margin on veins 3 and 4, and almost to the margin on veins 6 and 7. The terminal space, except as interrupted, is evenly dark or smoky, as is the cell, except the ordinary spots and such portions of the median and basal space as are not contrastingly yellow. Basal line wanting. Transverse anterior line evident as a black oblique mark in the median cell, as an outwardly curved line in the submedian interspace, and occasionally marked by a few scales below vein 1. Transverse posterior line broken, a little lunulate, chiefly marked by the difference in shade between median and subterminal spaces, interrupted on the costa and in the submedian interspace. Subterminal line pale, preceded by a series of interspaceal black, sagittate spots and forming strong dents, cutting the terminal space on

veins 3, 4, 6, and 7. The median vein is white, and below it, in the basal space, is a black shading which becomes diffuse inferiorly. Claviform black ringed, of good size, concolorous. Orbicular oblique, oval, often irregular, varying in size, complete if small, open to the costa if larger, outlined in black, narrowly annulate with white, center yellowish or gray. Reniform upright, rather narrow, filling the end of the cell completely, incomplete above and below, narrow kidney-shaped, defined by black scales and a narrow white annulus, centered with yellow. Secondaries white, with a smoky terminal line from which a faint dusky shade may extend a short distance inward. Beneath, primaries smoky with a dark discal spot and white veins; secondaries white, only a little powdery, with a smoky outer line and a small discal spot.

Expanse, 27 to 33 mm.=1.08 to 1.32 inches.

Habitat.—Denver, Colorado; Foothills (Bruce); Calgary, Canada, July 23, August 29 (Dod).

Seven specimens, all males. The three Denver specimens are from as many different collectors, and Mr. Bruce probably collected his example near Golden.

The species resembles my *flavidens*, and I had associated the two, until the occurrence of females of the older species caused a reexamination of the series. In the new form the general color is lighter, the contrasts are much greater, and the secondaries are pure white.

Type.—Cat. No. 4791, U.S.N.M.

7. CARNEADES NEVADA, new species.

Ground color ashen gray over fuscous. Head with an indefinite dusky frontal line, palpi brown at the sides. Collar gray tipped, with a black transverse line above the middle and below which there is a paler fuscous shading. Thorax squared, large, vestiture dense, mostly flattened hair, tuftings not well marked, partagia defined. The primaries appear somewhat strigate, owing to the absence of distinct transverse maculation, the paler median vein, and the tendency to define the other veins. Basal line marked only by a pale interruption of a black basal shade, which is not prominent and does not cross the basal space. Median lines marked on the costa only, though the location of the transverse anterior line is marked by the inception of the claviform, and the transverse posterior line may be found by careful search; but practically both are obsolete. Subterminal line obsolete. There is a series of black terminal spots from which blackish rays extend into the interspaces. A pale line at the base of the fringes. Claviform moderate in size, concolorous, outlined in black, pointed at the tip. Orbicular oval, elongate, decumbent, narrowly white-ringed, tending to an outward extension toward the reniform. Reniform small, broadly lunate, outlined by black scales, annulate with whitish. A somewhat paler shading extends obliquely from beyond the reniform to the apex, and a more indefinite lighter shade extends through the sub-

median interspace. Secondaries white, with a distinct, somewhat lunate blackish terminal line, and a dusky interline in the unusually long white fringes. Beneath white, gray powdered, both wings with small discal spots, and a series of distinct terminal lunules; primaries also with a partial exterior line.

Expanse, 35 to 37 mm.=1.40 to 1.48 inches.

Habitat.—Nevada.

Three male specimens from Mrs. F. O. Herring, all of them a little rubbed, but very much alike so that all the details could be easily determined. The species belongs with *hollemani* in the *pityochrous* series, but differs obviously in the heavy quadrate thorax, the separate ordinary spots, and the pure-white secondaries.

Type.—Cat. No. 4788, U.S.N.M.

8. CARNEADES CONTAGIONIS, new species.

Ground color a very pale yellowish or creamy gray, powdered with black scales. Head and thorax without ornamentation. Primaries with the median lines marked by black spots on the costa, and beyond that vaguely indicated. In the best-marked examples the basal line is black on the costa and has a short mark below the median vein. The transverse anterior line has a black costal dot and below the median vein there is a powdered single line, outwardly oblique and reaching the inner margin at nearly the middle of the wing. The transverse posterior line is marked by a black spot above the reniform on the costa, and then by short black marks on the veins, which give a course outwardly bent over the cell and then almost evenly oblique below. The terminal space is a little black powdered and in a vague way defines an irregular subterminal line. Where the powdering is slight there is no trace of the line apparent. Where the powdering is well marked the course of the imaginary line can be made out. There is a series of black terminal lunules. The fringes are concolorous with the rest of the wing. Orbicular an irregular black spot without defined margins, which is sometimes covered by scales of the ground color. Reniform an indefined lunule, also without distinct margin, and occasionally more or less obsolete. Secondaries in the males pure silky white, the veins a little darker marked in some specimens and with a distinct trace of a smoky shade at the base of the fringes. In the female they are somewhat smoky. Beneath white, a little black powdered with a more or less obvious discal spot on both wings—most obvious on the primaries—and sometimes with a broken exterior line.

Expanse, 32 to 35 mm.=1.28 to 1.40 inches.

Habitat.—Glenwood Springs, Colorado, August 7, September 10, October 21 (Dr. Barnes); Garfield County, Colorado, 6,000 feet (Mr. Bruce); Verdi, Nevada.

Twelve specimens are under examination and they resemble each other strongly. The ground color varies a little in shading, depending

upon the amount of yellow mixed with the gray. The amount of powdering on the surface is also a variable quantity, and sometimes it may be fairly well covered with black atoms. Of the maculation, the costal dots, representing the beginning of the ordinary lines, are the most constant, and the dusky reniform comes next. The blackish orbicular may be added in better-marked specimens, and finally the lines may become fairly well indicated in the manner already described. The species belongs to the *pitychrous* section of the genus and is somewhat related to *citricolor*. The vestiture does not form evident tufts in any of the specimens before me, and in that particular there is a resemblance to some of the species allied to *bostoniensis*.

Type.—Cat. No. 4146, U.S.N.M.

9. CARNEADES LOYA, new species.

Ground color an even dark mouse gray. Collar with a broad, contrasting, transverse band. Thoracic vestiture mixed scales and hair, patagia marked, tuftings evident. Primaries with the ordinary lines traceable only by black scales after close search, and they offer nothing distinctive as far as can be seen. Subterminal line marked by yellow scales forming irregular dots; preceded and followed by an irregular dusky shading. Orbicular moderate in size, ringed with yellowish, concolorous. Reniform elongate kidney-shaped, narrow, ringed with pale yellow, centered with blackish. Claviform wanting. Secondaries yellowish smoky at base, smoky blackish at margins; veins and a discal lunule blackish, fringes yellow at base, smoky centrally and whitish at tip. Beneath, smoky fuscous, powdery, both wings with a discal spot and a partly complete outer line.

Expanse, 36 mm. = 1.44 inches.

Habitat.—High Sierras, California (Dr. Dyar).

One female, a little crippled, but so obviously unlike all the known forms that I do not hesitate to describe it. It may be associated with *bicollaris*, from which, however, it differs obviously. There is a possibility that this may be the female of *tocoyæ* (No. 25), but that would indicate a range of variation that I am not ready to admit without further evidence. *Loya* is the Indian name for the Sentinel, Dr. Dyar says, and the specimen bears his No. 11278.

10. CARNEADES FLAVISCAPULA, new species.

Ground color dull fuscous brown, with small gray powderings. Collar with a black line surmounted by gray scales, inferiorly with a reddish shade which, at the base of the wings, forms a rusty red tuft. Primaries very evenly dusty, the maculation not relieved, and traceable only by careful observation; yet it is all present. The course of the median lines is as usual, and too faintly marked to show characteristic features. Claviform indicated by dusky scales. Orbicular subquadrate, concolorous, defined by a few black scales and a narrow gray ring. Reniform

moderate in size, kidney-shaped, traceable by black and gray scales, its outer middle invaded by a yellowish shading, which is the only obvious bit of color in the wing. Subterminal line fairly indicated by yellowish scales. Thoracic vestiture mixed flattened hair and scales, patagiæ and tuftings very fairly marked.

Expanse, 32 to 33 mm. = 1.28 to 1.32 inches.

Habitat.—New Mexico.

Two males from the Hulst collection, in fair condition. This is an obscure form which from its lack of maculation should be referred to the *pityochrous* series, where it has no close allies. It is probably really nearer to the *tessellata* type, but with all the contrasts faded out. Perhaps its best place for ready recognition is with *atomaris*.

Type.—Cat. No. 4810, U.S.N.M.

11. CARNEADES EXCOGITA, new species.

Ground color varying from mouse gray to fawn; that is, a soft, reddish gray, in which the gray scales vary the tint. Head and thorax concolorous. Palpi black at sides. Collar with a distinct, black, median transverse line, narrowly edged above with paler. Vestiture consists of flattened hair, patagia evident, the divided crest and posterior tufts well marked in good examples. Primaries with all the markings obscure; the lines barely traceable and the ordinary spots hardly defined. Basal line indicated by geminate, dusky spots on the costa. Transverse anterior line geminate, in the best marked examples the included space a little paler, outer defining line oblique, outcurved or angulated in the interspaces. Transverse posterior line barely traceable; apparently of the usual type. Subterminal line yellowish, irregular, more or less broken; sometimes marked by a slightly darker preceding shade; sometimes relieved by a dusky tint on both sides of it. Claviform indicated by scattered black scales in some specimens. Orbicular round or nearly so, moderate in size, incompletely outlined by black scales. Reniform concolorous or a trifle dusky, large, kidney-shaped, extending well below the cell, outlined by scattered dark scales and sometimes relieved by a few yellow scales. Secondaries smoky, paler in the male, a little lighter basally, fringes whitish, with dusky interline. Beneath whitish, powdery, disc of primaries smoky, a more or less obvious common line and discal spot.

Expanse, 32 to 37 mm. = 1.28 to 1.50 inches.

Habitat.—Glenwood Springs, Colorado, July 3–29 (Dr. Barnes).

Ten examples, evenly divided as to sex, varying only in tint and in the relative distinctness of the markings. In no case is it more than easily traceable, and sometimes the wings are practically immaculate.

The species belongs to the *velleripennis* series and should be readily placed there. It has a vague superficial resemblance to *Noctua piscipellis* without the longitudinal markings.

Type.—Cat. No. 4799, U.S.N.M.

12. CARNEADES EXCULTA, new species.

Ground color a soft, dark, red-brown, overlaid by gray. Head and thorax immaculate; collar without a transverse line. Vestiture, slightly flattened hair, the tuftings indistinct. Primaries, at first sight immaculate. The median lines indicated on costa by dusky spots and, under a lens, the transverse anterior line can be traced across the wing by a series of golden brown scales. Terminal space slightly darker, thus feebly indicating an irregular subterminal line. Ordinary spots marked by somewhat darker, lead-colored scales and, under the lens, outlined by golden brown scales. Secondaries pale, smoky yellow, darkening to smoky outwardly, fringes whitish yellow. Beneath whitish, powdery costal and outer margins darker, smoky.

Expanse, 33 mm. = 1.32 inches.

Habitat.—Northwest British Columbia.

A single male, received from Mr. B. Neumoegen some years ago and never satisfactorily placed. It resembles *excogita* at first sight, but is more stumpy winged, lacks the prominent black line on the collar, and has the maculation much more completely obsolete.

13. CARNEADES NÆVULUS, new species.

Ground color dull, powdery, ashen gray. Head and thorax immaculate, collar with a dusky line just below tip; but this is obscure in most examples. Vestiture composed of long, flattened hair, anterior crest not obvious, posterior tufting fairly well defined, patagia not marked. Primaries with a rough, powdery appearance, none of the maculation well defined. Basal line geminate, smoky, interrupted. Transverse anterior line geminate, smoky, the two parts about equally obscure, outwardly oblique and rather evenly outcurved in the interspaces. Transverse posterior line obscure, fuscous, geminate on the costa, rather squarely bent over the cell, inwardly oblique and very even below this point. Subterminal line irregular, punctiform, pale, sometimes defined by a vague preceding shade, or a slight deepening of the terminal space, and sometimes wanting altogether. A series of blackish terminal lunules, followed by a yellowish line at the base of the fringes. No obvious median shade or line. Claviform very small, and never completely outlined by blackish scales. Orbicular variable in size and shape, concolorous, outlined by black scales, complete only when it is small and round. Reniform large, kidney-shaped, extending below the cell, concolorous, incompletely black ringed. Secondaries dirty white in the male, with a somewhat defined, smoky, powdery outer border, a smoky terminal line, and a discal lunule, the veins being also smoky; in the female they are smoky throughout, but become more whitish and transparent basally; discal lunule evident. Beneath, primaries gray, powdery, secondaries white, powdery along costa, all wings with a discal spot; no evident outer line.

Expanse, 35 to 40 mm.=1.40 to 1.60 inches.

Habitat.—Placer County, California, in September.

Nine males and three females from the U. S. National Museum, collected by Mr. A. Koebele. There is very little variation in the series, save such as is caused by a staining in either a moist cyanide bottle, or a softening jar containing too much carbolic acid.

The form of the orbicular is the only changeable feature, and this is not alike in any two specimens. The species belongs to the *pityochrous* series and has some resemblance to *cogitans*, lacking, however, the black basal streak of the latter species.

Type.—Cat. No. 4797, U.S.N.M.

14. CARNEADES MEGASTIGMA, new species.

Ground color dull luteous gray. Head, collar, and thorax immaculate. Thoracic vestiture thin and slightly flattened hair, neither patagia nor tuftings well marked. Primaries rough with black powderings, the maculation obscure. Basal line geminate, marked by scattered scales only or obsolete. Transverse anterior line upright or nearly so, outcurved in the interspaces, geminate, but the inner element barely traceable. Tranverse posterior line geminate on the costa and to the angle opposite middle of cell, thence single, broken, hardly lunulate, smoky, almost rigidly oblique to the margin. Subterminal line a little paler, powdery, somewhat defined by a preceding powdery shade, which may be absent. A very narrow, broken terminal line, followed by a yellow line at the base of the fringes. No obvious median shade; but in one specimen there is an indication that it might be expected in a large series. Claviform indicated by smoky scales. Orbicular very large, oblique, of the palest ground, defined at the sides only. Reniform large, broad, almost oblong or only feebly kidney-shaped, space between the spots forming a smoky V. Secondaries smoky, whitish toward base, with a discal lunule and veins dusky, fringes white. Beneath, primaries even, dull gray, secondaries more whitish, both with a vague discal spot.

Expanse, 33 to 38 mm. = 1.32 to 1.52 inches.

Habitat.—Edge Calgary, August 24; Calgary, September 15, Canada (Dod).

Two females; one, the smaller, in good condition, the other lacking one primary and an abdomen, lost in the mail, but otherwise good. The smaller specimen is the more evidently marked and is quite powdery; the other is more even and, the powdering being absent, the markings are much less distinct. The species has the color of *acornis*, and may for the present be placed in that series.

Type.—Cat. No. 4811, U.S.N.M.

15. CARNEADES STIGMATALIS, new species.

Ground color a somewhat light reddish brown, shaded with blackish scales along the veins and sometimes over the entire surface, so as to

give a dull, dark, smoky brown appearance. Head and thorax immaculate. Vestiture, mixed with scales and flattened hair, the thoracic divided crest and posterior tuftings distinct, patagia relieved. Primaries with transverse maculation obsolete or barely traceable. Basal line marked by smoky spots on the costa only. Transverse anterior line, when traceable, almost upright, outcurved in the interspaces, irregularly so in the submedian interspace. Transverse posterior line, when traceable, bent over and close to the reniform, then oblique to the margin, even and inwardly diffuse. Subterminal line irregular, usually marked by yellowish scales and the somewhat darker terminal space; occasionally also by preceding darker scales; rarely it is entirely wanting. A series of small terminal lunules, followed by a yellow line at the base of the fringes. Claviform small, narrow, pointed, usually well and completely defined; sometimes with a filling of yellow scales. Reniform irregular, varying from almost round to obliquely oval, and in size from very small to quite large. It is defined by black scales, within which is a yellow annulus and the center is also a little powdered; in the smallest spot the center is entirely yellow, simply because the annulus takes up all the space inside the black ring. Reniform moderate in size, kidney-shaped, sometimes a little enlarged inferiorly, and extending below the cell. It is defined by black scales, within which is an annulus of yellow scales. The center of the spot is lightened superiorly by yellow scales and darkened inferiorly by leaden gray or blackish. Secondaries whitish, in the male with a narrow soiled outer border which is inwardly diffuse; in the female with a decided, smoky-yellow tinge, the dusky outer border broader. The veins are dusky marked, and there is a narrow, smoky, discal lunule. Beneath whitish, powdery, with a more or less indefinite common outer line and a discal spot on all wings.

Expanse, 37 to 40 mm.=1.48 to 1.60 inches.

Habitat.—Glenwood Springs, Colorado, August (Br. Barnes).

One male and 5 females, all in fair condition. The species differs from its nearest allies in the somewhat well-marked veins and the obscurity of its ground color. There are several other points of difference, making up altogether the sum of a good species belonging to the *pityochrous* series.

Type.—Cat. No. 4805, U.S.N.M.

16. CARNEADES TERMESSUS, new species.

Ground color luteous gray, with a very even powdering of fine black scales that gives the insects a dusty or ashen appearance. Head and thorax immaculate, palpi rusty yellowish in front. Thoracic vestiture consists of only slightly flattened hair, patagia not relieved, anterior crest feebly, posterior tuft distinctly evident. Primaries with the markings scarcely darker than the ground color, so that at a little distance the wing seems immaculate. Basal line geminate, broken,

marked on the costa only. Transverse anterior line geminate, upright, the two parts more widely separated than usual, a rather sharp outward bend in the cell, another below the internal vein, and a feeble outcurve in the submedian interspace, giving it a somewhat more than usual characteristic appearance. Transverse posterior line geminate, the inner line best marked and a little diffuse, as a whole evenly outcurved over the cell, and scarcely drawn in below. No median shade or line. Subterminal line practically obsolete, though its location can be discerned by slight differences in shading, notably on the costa, where a dusky subterminal shading a very little relieves the apex. A series of very small black terminal lunules. Claviform small, but as well indicated as any other feature. Orbicular moderate, oval, outlined by smoky scales and a very little paler than the ground. Reniform large, kidney-shaped, extending below the cell, concolorous, imperfectly outlined. Secondaries soiled whitish, with a narrow smoky outer border, a distinct terminal line and an evident, blackish discal spot. Beneath, primaries gray, secondaries white, both powdery and with an unusually distinct black discal spot on all wings.

Expanse, 37 to 38 mm.=1.48 to 1.52 inches.

Habitat.—Yellowstone Park, Wyoming, in August (Dr. Barnes).

Two males, very much alike, and in good condition. The species belongs to the *pityochrous* series and is allied to *mitis*, than which it is larger, darker, without the reddish cast and with soiled instead of snowy secondaries.

17. CARNEADES ENTERIDIS, new species.

Ground color a very pale grayish yellow. Collar with a narrow black line, edged above with white scales. Thoracic vestiture scaly hair, the tufts and patagia fairly marked, a rosy flush on the disk. Primaries with the cell and terminal space, except apex, smoky; the markings smoky brown, all more or less broken. Basal line geminate, broken in the cell. Transverse anterior line geminate, prominently marked on the costa, obscure to the median vein, where it sends in a long inward tooth, then outwardly oblique and outcurved in the interspaces to the margin, the inner portion very feebly marked. Transverse posterior line geminate, abruptly bent on the costa over the reniform, thence very evenly parallel to the outer margin; inner part crenulated, sending out long teeth on the veins terminating in the venular dots of which the outer element of the line is composed. Subterminal bisinuate, marked by a dusky preceding shade on the costa and below the pale apex, by the dark terminal space. A series of small terminal lunules is followed by a creamy yellow line at base of the fringes, which have double, gray interlines. A median shade crosses between the ordinary spots and a little outcurved below them, the space to the transverse posterior line being somewhat darker than the ground. Orbicular oblong, oblique, creamy gray, with a narrow white annulus

and a ring of black scales which is not complete superiorly. Reniform large, kidney-shaped, outlined by blackish scales which do not form a continuous line, an inner ring of smoky brown, leaving an annulus and central lunule of the paler ground color. Claviform pointed, moderate in size, outline smoky and broken. Secondaries white, with a smoky outer margin, which starts as a line at the anal angle and broadens to a band at the apex; veins and a small discal lunule also smoky. Beneath white, powdery, both wings with a blackish discal spot, primaries with an outer line through the costal region.

Expanse, 37 mm. = 1.48 inches.

Habitat.—Pullman, Washington (Piper).

One male in fair condition. The species belongs probably to the *pityochrous* series, though the median shade is traceable. There is nothing sufficiently near to it to cause confusion, while the sharply defined dusky terminal space indicates the *ochrogaster* type of maculation.

18. CARNEADES ATROPULVEREA, new species.

Ground color dull smoky brown, densely and quite evenly powdered with black scales. Head and thorax immaculate, collar with a faint, darker, central line. Thoracic vestiture mixed scales and hair, patagia not relieved, tuftings feebly marked, though evident. Primaries with all the markings obscure and no contrasts of any kind. Basal line geminate, best marked by the yellowish scales in the included space. Transverse anterior line geminate, blackish, and with four small outcurves. Transverse posterior line geminate, evenly and not greatly outcurved over the cell, inner part crenulate, outer even and very feebly marked. Subterminal line scarcely paler, marked by the slightly darker terminal space, and an irregular, somewhat broken, dusky subterminal shading. A series of small terminal lunules, followed by a yellowish line at the base of the fringes. Median shade broad, blackish, diffuse, angulated below the reniform and making the most obvious bit of ornamentation on the wing. Claviform barely indicated. Orbicular obsolete, or barely traceable by a few lighter scales. Reniform moderate in size, upright, kidney-shaped, vaguely defined by an incomplete yellowish annulus. Secondaries even, smoky fuscous, with paler fringes and a feebly defined smoky lunule. Beneath, primaries smoky, a little gray powdered, secondaries gray, powdered with smoky, with a broad, smoky outer band and discal lunule.

Expanse, 37 mm. = 1.50 inches.

Habitat.—Denver, Colorado, October 10; Fort Collins, Colorado (Gillette).

Three females, one of them rubbed and otherwise imperfect. Larger and narrower winged than *intrita*, with all the maculation obscured and the median shade unusually evident. The orbicular is almost entirely obsolete and the reniform is very incompletely outlined. It is to be regretted that no male was received.

19. CARNEADES COMPRESSIPENNIS, new species.

Ground color dull smoky red brown, roughly powdered. Front brown. Collar with a black median line, below which it is brown. Thoracic vestiture flattened hair, some of it tipped with gray, patagia and tuftings fairly marked. Primaries with the vestiture rough and powdery in appearance, all the markings fragmentary, cell filled with richer brown around the ordinary spots, costa at base, gray powdered. Basal line geminate, broken, black, included space gray. Transverse anterior line geminate, black, inner portion less evident, included space paler, inwardly bent on the median vein, outwardly oblique and outcurved in the interspaces below. A black shading below the median vein connects the inward tooth of transverse anterior line with the outward bend of basal. Median vein obscurely pale powdered. Transverse posterior line geminate, inner portion lunulate, outer even, included lunules reddish. Subterminal line yellowish powdery, a little irregular, marked by a preceding brown shade, the powdering outwardly diffuse, lightening the apex and sometimes the terminal space. A series of small terminal lunules, followed by a yellowish line at the base of the fringes. No obvious median shade. Claviform moderate in size, outlined by black scales. Orbicular irregular, subquadrate, oblique, narrowly pale ringed, center pale powdered. Reniform moderate in size, rather narrow, kidney-shaped, annulate with yellowish gray, the center pale powdered. Secondaries evenly smoky in both sexes, fringes with a yellow line at base. Beneath dull gray, powdery, with very faint ordinary spots and only a trace of an outer line.

Expanse, 33 mm. = 1.32 inches.

Habitat.—Yosemite, California, male, Dr. Dyar, No. 9617; female, special locality and source not marked.

One male and one female only, very much alike and in fair condition. The species is allied to *intrita* Morrison, but is much more powdery as well as somewhat broader winged.

20. CARNEADES FALERINA, new species.

Ground color pale, whitish luteous with deeper luteous shadings and smoky powderings. Head and thorax concolorous; palpi dusky at the sides, color with rather an indefinite smoky median line, best marked in the female. Thoracic vestiture mixed with scales and flattened hair, patagia marked, tuftings evident though not prominent. Primaries with the markings all present and recognizable, but not strongly marked or contrasting, the lines luteous or smoky. Basal lines geminate, marked by smoky spots on the costa and below the median vein. Transverse anterior line geminate, inner portion less marked, upright or a little oblique outwardly, interrupted in the costal space, with small outcurves in the interspaces. Transverse posterior line geminate on the costa, the outer portion lost below the costal space, inner part

crenulate, evenly outcurved over the cell and just a little drawn in below. Subterminal line of the ground color, irregular, almost angulate, marked by the darker terminal space and by a preceding dusky shade, which is always distinct on the costa, but broken or even obsolete below that point. A series of small, brown terminal lunules. Claviform feebly indicated by darker scales, variable in size. Orbicular round, oval, or elongate, variably evident, outlined by black or dusky scales, and in the female with a dusky central shading. Reniform upright, moderate in size, kidney-shaped, incompletely and imperfectly outlined, the center dusky. There is also a diffuse, darker, luteous median shade, which darkens a trifle the outer portion of the median space and may be scarcely noticeable. In one specimen the ordinary spots are normally separated, in another the orbicular almost touches the reniform, in the third the spots join and seem almost confluent. Secondaries white in both sexes, the veins a little yellowish, a broken, smoky, terminal line and a vague dusky outer shading. Beneath white, a little powdery, with a dusky discal spot and an incomplete, powdery outer line on all wings. The fringes, especially on secondaries, are unusually long.

Expanse, 37 to 40 mm. = 1.48 to 1.60 inches.

Habitat.—Glenwood Springs, Colorado, August and October (Dr. Barnes); Nevada (Mrs. Herring).

Two males and one female, all different, yet I believe representing one species only. The long fringes to the secondaries, the plump, heavy body, and the rather lengthily serrated male antennæ suggest a *Porosagrotis*, but the genitalia agree with the *Carneades* type. In the male type the smoky powdering is quite evenly distributed, except in the subterminal space, and all the maculation is obscure. The male cotype is less powdery and all the markings are in consequence better defined. The female type while less powdery is quite as obscurely marked as the first-mentioned male. More material would be very desirable to fix the range of variation in this species.

Type.—Cat. No. 4785, U.S.N.M.

21. CARNEADES VALLUS, new species.

Ground color very pale gray, over a pale luteous base. Palpi yellow in front, dusky at the sides. Beneath dusky. Vestiture, thin, hairy, somewhat divergent. Top of head and base of collar whitish, the latter tipped with yellowish hairs. Thoracic vestiture forming no obvious tufts; but posteriorly the hair is tipped with yellowish. Primaries quite densely black powdered, darkening the wing beyond the transverse anterior line. All the lines single. Basal line blackish, distinct, reaching the submedian vein, bent on the median. Transverse anterior line smoky, a little outcurved, with three interspaceal outcurves, of which that in the submedian interspace is the longest. Transverse posterior line obscure, crenulated, unusually close to the outer margin,

broadly outcurved over the cell, then parallel with the outer margin. Subterminal line barely indicated by a series of dusky spots. Median shade broad, diffuse, vague, a little outwardly bent at its middle. Orbicular round, moderate in size, a little paler than the ground, but not otherwise defined. Reniform moderate in size, indefined and incomplete, a little paler than ground, but with a central dusky crescent, which is diffuse and leaves the lower part of the spot scarcely separable from the ground. No trace of claviform. Secondaries smoky, pale gray, scarcely darker outwardly, veins marked, and end of cell indicated by a narrow lunule. Beneath, pale yellowish gray, silky, both wings with an obscure outer shade line and a vague discal spot, secondaries with a blackish line through the cell from base almost to the lunule.

Expanse, 40 mm.=1.60 inches.

Habitat.—Laggan, British Columbia, 5,000 feet, September 9 (Bean).

A single female only, in fair condition. The species is allied to *bostoniensis*, but is much more obscure and powdery. It has that peculiar pallid, washed-out appearance that is characteristic of northern mountain forms, as well as the loose, woolly vestiture. I know of nothing with which this might conflict.

22. CARNEADES SESSILE, new species.

Ground color an even, dull, smoky gray, without marked contrasts of any kind. Head and thorax concolorous, the palpi tipped with yellow. Vestiture hairy; but somewhat flattened, not loose or diverging. Collar well relieved, patagia not differentiated, tuftings barely indicated in the female, fairly suggested in the male. Primaries with a faint reddish shading, best marked in the male, very evenly and not densely black powdered. Basal line geminate, broken, blackish, not well marked. Transverse anterior line smoky, geminate, the two parts almost equally well defined, almost upright to the median vein, a little outcurved below, and a longer, outward loop below the internal vein. Transverse posterior line geminate, inner portion evenly outcurved over the cell, lunulate and a little incurved below; outer part obscure, smoky, even. Subterminal line vaguely traceable, really visible only near the costa, where it is marked by the contrast between the apex and a slightly darker subterminal shading. Median shade diffuse, rather broad, slightly darker than the ground color and a little darkening the cell between the ordinary spots. Claviform small, concolorous, completely outlined in smoky. Orbicular irregularly oval, decumbent, outlined in black, of the ground color or a very little paler. Reniform large, broad, irregular, extending below the median vein, outlined by black scales, concolorous or a very little paler. There is a narrow, black, broken, terminal line, followed by a yellowish line at the base of the fringes. Secondaries smoky yellowish, paler at the base, in the male rather whitish, with a smoky discal lunule and a white fringe which, in the

female, is somewhat contrasting. Beneath whitish, powdery, disk of primaries smoky, darker in the female; no outer line; but a discal spot on all wings.

Expanse, 40 mm. (male) to 42 mm. (female) = 1.60 to 1.68 inches.

Habitat.—Colorado (Bruce); Hall Valley, August (Barnes).

One male (Bruce) has been in my collection for years; the female has been recently received from Dr. Barnes. The species is much more obscure throughout than *messoria*, and the hairy vestiture throws it rather to the *bostoniensis* series, where it does not conflict with any described species.

A third specimen, also from Colorado, near Denver, I refer doubtfully to this species. It expands only 35 mm., is more sharply marked throughout, and the subterminal space is uniformly darker, relieving a subterminal line which is distinctly toothed on veins 3 and 4. The secondaries are also more whitish and the smoky outer border is better defined.

23. CARNEADES RELAXUS, new species.

Ground color pale, smoky fuscous, with a slightly reddish tint. Head and thorax concolorous. Palpi tipped with yellowish, dusky at the sides. Collar with an incomplete brown line near the tip. Thoracic vestiture of flattened hair, patagia hardly relieved, tuftings just indicated. Primaries without contrasts, the lines smoky rather than blackish. Basal line geminate, indicated on the costa and submedian interspace only. Transverse anterior line geminate, inner line marked on costa only, outer a little oblique and feebly outcurved in the interspaces. Transverse posterior line geminate, outer line lost below the cell, inner crenulated, as a whole outcurved over cell, and then almost parallel with the outer margin. Subterminal line pale, irregular, with small teeth on veins 3 and 4, relieved by a continuous, dusky, preceding shade, the terminal space being also more or less dusky. A series of brown, terminal lunules. Median shade vague, diffuse, barely traceable. Claviform absent in the specimens before me, but I should expect to find indications of it in the species. Orbicular round or oval, outlined by black or smoky scales, concolorous, center with or without dusky powderings. Reniform large, kidney-shaped, extending a little below the cell, outlined by black scales, center more or less dusky inferiorly. Secondaries very pale yellowish, becoming smoky outwardly; fringes whitish, discal lunule present. Beneath whitish, powdery, a more or less obvious common outer line, and all wings with discal spots.

Expanse, 38 mm. (male) to 39 mm. (female) = 1.52 to 1.56 inches.

Habitat.—San Francisco and Sierra Nevada, California.

One male and one female, and there is just a little doubt as to their really being sexes of the same species; line for line they are the same, and such little differences as occur are well within the range of varia-

tion in allied species. Nevertheless there is a vague dissimilarity which prevents my marking the female as a type, though it is the better example of the two.

At first sight this closely resembles *sessile* and is, indeed, its near ally; but it is paler, with a more yellowish tint throughout; there is no obvious claviform, the subterminal line is entirely obvious, and the transverse posterior line is crenulated and practically single below the cell.

Type.—Cat. No. 4800, U.S.N.M.

24. CARNEADES LUTEOSITUS, new species.

Ground color dull luteous, with rusty shadings on thorax and primaries. Head and thorax else immaculate. Vestiture hairy, patagia marked, tuftings obscurely indicated; thorax as a whole small in comparison with the long abdomen, which considerably exceeds the hind angle of the secondaries in both sexes. Primaries with ornamentation well defined. Transverse lines all single, broad, a little diffuse. Basal line distinct. Transverse anterior line upright, a little outcurved in the submedian interspace. Transverse posterior line with a broad, even outcurve over the cell, oblique or a little incurved below, with little, sharp points on the veins. Subterminal line marked by a dusky preceding shade, very even, the subterminal space sometimes with pale scales, lightening it perceptibly. A series of narrow, dusky, terminal lunules. Median shade not obvious in the male, in the female dusky, diffuse; oblique between the ordinary spots and parallel with transverse posterior line below. Orbicular large, round, without defining line, save the contrast between its paler shade and the surrounding ground. Reniform marked chiefly by a smoky lunule with irregular paler edges. Claviform wanting. As a whole the basal space is a little paler, somewhat gray powdered; the median space is somewhat the darkest and shaded with rusty and blackish. Secondaries dark smoky, paler at base, with a blackish lunule and yellow fringes. Beneath paler reddish luteous; all wings with a discal lunule and an incomplete outer line.

Expanse, 35 to 36 mm. = 1.40 to 1.44 inches.

Habitat.—Hall Valley, Colorado, July 24 to 30 (Dr. Barnes).

One male and one female, both in good condition. In maculation the species resembles *bifasciata*, but in color it is totally different, and, indeed, also in the course of the lines. The male is somewhat aberrant for a *Carneades* in having the antennal joints only a little marked and the lateral tuftings short and feeble.

25. CARNEADES TOCOYÆ, new species.

Ground color a dull, pale, brick red, overlaying a yellowish base. Collar with a feebly marked central line. Thoracic vestiture flattened hair, tufts obvious. Primaries with the marking only a little darker,

not contrasting, the included space in the geminate median lines lightened by yellow. Basal line brown, geminate, best marked by the included yellow shade. Transverse anterior line almost upright, broadly outcurved in the interspaces. Transverse posterior line geminate, outer part faint, even; inner crenulate, brown, as a whole evenly and not greatly outcurved over the reniform, evenly oblique below. Subterminal line irregular, broken, paler, marked by a slightly darker preceding shade, the terminal space marked with dusky in the veins. Median shade line narrow, blackish, a little irregular, as a whole a little outcurved. A series of black terminal lunules, beyond which is a yellow line at the base of the fringes. Claviform barely indicated. Orbicular small, round, outlined in yellow. Reniform moderate in size, kidney-shaped, rather narrow, outlined in yellow, filled with blackish. Secondaries yellowish at base, becoming smoky outwardly, veins and a discal lunule also smoky. Fringes yellow at base, whitish at tip, with a smoky central line. Beneath dull yellowish, powdery, primaries with a diffuse blackish oval, representing the pale outline of the reniform above; secondaries with a small black discal lunule.

Expanse, 37 mm.= 1.48 inches.

Habitat.—High Sierras, California (Dr. Dyar).

A single male in fair condition, No. 11277. The species has no very close allies, but may come at the end of the *bostoniensis*, or at the head of the *messoria* series. In either case it is readily distinct.

Tocoya, according to Dr. Dyar, is the Indian name for the north dome, near where this insect was taken.

CARNEADES MESSORIA Harris.

In this species all the normal maculation is well written, and all the usual spots are evident. Basal, transverse anterior and transverse posterior lines are obviously geminate, and while the inner part of the transverse anterior and outer part of the transverse posterior line are less obvious, and may be even somewhat obscure, there is never any doubt of their actual presence. The median shade is equally obvious in most cases, and is sometimes as well marked as the median lines, though always a little diffuse. It is sometimes almost upright, but as a rule is a little outwardly oblique from the costa to the inferior margin of the reniform, and from that point is nearly upright to the inner margin, which it reaches close to the transverse posterior line. The transverse anterior line is a little oblique outwardly, with three main interspaceal outcurves, of which that in the submedian interspace is broadest, but as a rule not quite so much exserted; that below the submedian vein is always most bent outwardly. The transverse posterior line is very evenly bent over the cell, and is then oblique below, hardly incurved in any case, unless exceptionally. The inner part of the line is crenulate, and the outer portion crosses the tips of the points, leaving inclosed a series of lunules of the ground color or a

little paler. The subterminal line is always obvious and usually a little paler; but it may be concolorous and only defined by the somewhat darker terminal space. There may be a preceding dark or dusky shade and this may be broken; but it never forms sagittate spots or dashes, and it is never prominent. In no case is the terminal space paler than the subterminal, or as pale as the lighter parts of the wing. There is no basal dash or longitudinal mark of any kind. The claviform is narrow, concolorous, very rarely completely outlined, sometimes a mere blackish lunule indicating its tip; sometimes very short, sometimes extending to the middle of the median space; often very obscure, but always traceable in good specimens. The orbicular is of good size, black ringed, varying in shape from round to irregularly oval, ofttimes oblique. There is often a paler annulus within the black ring, and the entire spot is usually even and a trifle paler than the ground color of the wing; rarely it is just a little powdery, but is never dark centered. The reniform is always large, kidney-shaped, usually a little oblique, outlined by blackish scales, and within this a paler annulus which is only a slighter paler tinge of the ground and never prominent. The interior is also a little pale, but with a dusky powdering which yet leaves the spot as a whole paler than its immediate surroundings. The ground color of the primaries is a graying luteous with blackish powderings and little if any trace of red or brown. The cell between and beyond the ordinary spots is always a little the darkest portion of the wing, and sometimes the space between the median shade and transverse posterior line is also involved; but there are never any strong contrasts. The secondaries are whitish, with a faint yellow tinge, somewhat more pronounced in the female, and there is a smoky outer border, varying in width, always undefined, very narrow in the male, sometimes darkening almost half the wing in the female, especially along the inner margin.

The collar has always a black or blackish transverse median line.

The expanse varies from 32 to 42 mm., but the great majority of examples will be from 35 to 37 mm., without much difference in favor of the female.

The 25 males and 14 females under observation are distributed as to locality from the Atlantic to the Pacific, and there is no geographic variation observable.

The species has been thus carefully described as to its essential characters that others allied to it, actually or superficially, might be differentiated comparatively; and it is especially useful for this purpose because it is at once the most abundant and the most widely distributed of the forms, so that all collectors are most likely to possess examples.

26. CARNEADES INCUBITA, new species.

Is a close ally of *messoria*, from which it differs at first sight in the darker, blackish gray, ground color. In the female there is hardly a trace of the pale luteous ground, which is, however, easily seen in the

male. The general type of maculation is the same; but in the new species it is darker, more clearly written, while a white powdering on the costal cell and along the median vein gives a somewhat characteristic appearance. The cell around the ordinary spots is evidently darker and the centers of the spots themselves are dusky. This, in the case of the orbicular, serves as an easy method for ready differentiation, for in *messoria* this spot is never darkened; in the new form it is obviously dusky in every case, leaving a pale annulus inside the black defining ring. The transverse line in the collar is much more feebly marked than in *messoria* and the secondaries have the dusky shading blackish, rather than yellow tinged.

Altogether, while the individual differences are slight, the sum of the characters and their uniformity in the series before me indicates a good species.

Expanse, 35 to 42 mm.=1.40 to 1.68 inches.

Habitat.—Pullman, Washington, in August (Piper); Santa Cruz Mountains, California (Ehrhorn).

Five males and six females.

Type.—Cat. No. 4803, U.S.N.M.

27. CARNEADES TERRENUS, new species.

Ground color a dull, luteous, gray brown, irrorate with coarse black scales. Collar with a blackish transverse line. Primaries with all the markings present and of the *messoria* type. Transverse anterior line more nearly upright and the outcurves less marked. Transverse posterior line practically as in *messoria*. Subterminal line vague, broken, preceded by a more or less evident broken, blackish shade, which is never contrasting. Terminal space not darker than the ground. Median shade very vague and diffuse, sometimes scarcely traceable. Claviform never complete, usually marked by a few scales only, often obsolete. The ordinary spots much as in *messoria*, save that they are less relieved and the reniform is smaller, without central powderings. The cell between the ordinary spots is dusky; but this shade rarely extends beyond the reniform or into the median space. Secondaries even, smoky fuscous in both sexes, a little darker in the female.

Expanse, 35 to 40 mm.=1.40 to 1.60 inches.

Habitat.—Pullman, Washington, June and July (C. V. Piper).

A series of 12 males and 5 females is quite uniform in general appearance, obviously distinct from *messoria* by the darker, coarsely powdered primaries, on which the usual maculation is obscure, and by the uniformly dusky secondaries. The new species also averages larger than its ally, the majority of the examples attaining 38 mm.

Type.—Cat. No. 4802, U.S.N.M.

28. CARNEADES TERRITORIALIS, new species.

Ground color a very light reddish gray, tending to mouse gray, even, hardly powdery. Head and thorax immaculate, collar with a dusky

central line. Vestiture mixed scales and hair, patagia evident, anterior crest and posterior tuft distinct. Primaries with all the normal *messoria* markings present, very neatly and finely written. Basal line geminate, black, very distinct. Transverse anterior line geminate, inner part tending to become lost, outer fine, blackish, as a whole outwardly oblique, with strong outcurves in the interspaces, the one below vein 1 being the longest. Transverse posterior line geminate, outer portion even and tending to become lost, inner slender, crenulate, blackish; as a whole the line is abruptly bent on the costa and after a gentle curve over the cell it is almost straight to the hind margin. Subterminal line pale, a little irregular, broken, with somewhat longer dents on veins 3 and 4, marked on the costa by a dusky subterminal shade and below the clear apex by the dusky terminal space. There is a distinct though narrow black terminal line, somewhat thickened in the interspaces and followed by a narrow yellow line at the base of the fringes. Median shade smoky or blackish, rather narrow, margins a little diffuse, forming an obtuse angle against the reniform. Orbicular always traceable, concolorous, never completely outlined, rather small. Orbicular moderate or small, round or a little oval, narrowly black ringed, concolorous or a little paler. Reniform large, kidney-shaped, rather narrow, extending a little below the cell, not well defined except at the sides, incompletely pale ringed, center somewhat dusky. Secondaries in the male white, with an iridescent smoky tinge, especially toward the edges; veins, very small discal spot and outer margin narrowly smoky; in the female, transparently smoky, whitish toward base, else as in the male. Beneath white, disc of primaries smoky, a small, common discal dot, primaries often with an incomplete exterior line which is sometimes also begun on the secondaries.

Expanse, 32 to 36 mm. = 1.28 to 1.44 inches.

Habitat.—Denver, October 12; Salida, August 10 (Oslar); Glenwood Springs, October 1–7 (Barnes), all in Colorado; Pullman, Washington, September 24 (Piper).

Two males and three females are before me. The species resembles and is no doubt confused with *messoria*, but it is much more neatly marked, more even in ground color, with smaller ordinary spots and altogether paler secondaries. The species varies in ground color and in the relative distinctness of its ornamentation, but can always be separated from *messoria* by the characters given, when the two are side by side.

Type.—Cat. No. 4793, U.S.N.M.

29. CARNEADES FULDA, new species.

Ground color pale reddish brown, washed with gray, very even. Collar with a faint transverse line. Thoracic vestiture mixed scales and hair; patagia marked, a few black scales indicating a submargin, tuftings obvious. Primaries with all the markings faint, slender, not at all

contrasting, more or less broken and incomplete. Basal line geminate, blackish, marked only on the costa and submedian interspace. Transverse anterior line geminate, broken, brown, inner part of line tending to become lost; outwardly oblique, outcurved in the interspaces, a long bend below the submedian reaching nearly to the middle of the margin. Transverse posterior line geminate, fine, brown, inner part crenulate, outer even and scarcely marked; as a whole very evenly outcurved over the cell and evenly oblique below. Subterminal line marked by the somewhat more dusky terminal space except at apex, where a dusky shade precedes it, the contrasts being very feeble. Terminal line fine, black, continuous, followed by a yellow line at the base of the fringes, which are interlined with brown. Median shade feebly marked, almost upright, slightly darkening the space between the ordinary spots. Claviform indicated by a few scattered, blackish scales. Orbicular rather large, oval, decumbent, concolorous, outlined at sides by black scales. Reniform moderate in size, kidney-shaped, extending a little below the cell, incompletely outlined in black scales, with an incomplete pale annulus, the center dusted with lead-colored scales. Secondaries smoky whitish, paler at the base, veins dusky, discal lunule small, terminal line brown, fringes whitish. Beneath, whitish, powdery, disc darker, secondaries with a feeble discal lunule.

Expanse, 34 to 36 mm.=1.36 to 1.44 inches.

Habitat.—Alameda County, California, September.

Two female specimens from the U. S. National Museum, collected by Mr. A. Koebele. The species is of the *messoria* type, but very obscure, the markings not relieved against the reddish-gray backing. In the slender median lines it resembles *territorialis*, than which it is more red and decidedly more obscure.

Type.—Cat. No. 4792, U.S.N.M.

30. CARNEADES ITODES, new species.

Ground color a very pale luteous, washed with light reddish. Head and thorax concolorous, palpi smoky at the sides, collar with a smoky transverse median line. Thoracic vestiture mixed scales and flattened hair, patagia marked, anterior crest and posterior tufting well defined. Primaries very even in tint, all the markings smoky brown, quite evident; but not contrasting. Basal line geminate, complete, included space a little paler. Transverse anterior line geminate, inner portion not so well marked, oblique, with 4 subequal and not strongly marked outcurves. Transverse posterior line geminate, outer line vague, even, inner crenulate, included space a little paler. As a whole it is abruptly bent over the cell and a little incurved below. Subterminal line of the ground color, defined by the slightly darker terminal space and a dusky preceding shade, which is irregular, but continuous and best marked on the costa. A series of distinct, dusky, narrow, terminal lunules. Median shade rather narrow, diffuse, outwardly oblique and darkening

the space between the ordinary spots, evenly oblique inward and well removed from the transverse posterior line from the lower angle of the reniform. Claviform wanting, but there is a narrow and scarcely defined yellowish mark occupying its place and extending to the median shade. Orbicular round or nearly so, moderate or small, annulate with yellowish, centered with the ground color, darkened by a few dusky scales. Reniform moderate in size, kidney-shaped, extending a little below the cell, outlined in yellowish, filled with leaden gray or smoky. Secondaries yellowish white, darkening a little at the outer border to a distinct dusky terminal line; veins and a narrow lunule also a little darker. Beneath white, with a glistening yellowish tint, more or less powdery, primaries with an obvious discal lunule, secondaries with a small dusky spot.

Expanse, 37 to 40 mm. = 1.48 to 1.60 inches.

Habitat.—Arizona (Dr. Barnes).

Three good females, with no more definite locality than above given. The species is easily different from any heretofore described, though resembling at first a reddish *cænis*. The vestiture here is scaly rather than hairy, however, and the very evenly marked ornamentation is characteristic rather of *messoria*, near which the new form must be placed.

31. CARNEADES LAGGANÆ, new species.

Ground color dull, dark, ashen gray, with fuscous powderings. Collar gray and dark powdery, with a black, median, transverse line. Thoracic vestiture mixed scales and flattened hair, somewhat loose, patagia well marked, margins edged with black scales, tuftings distinct. Primaries with the markings well written, blackish, not strongly contrasting. Basal line geminate, distinct, dentate. Transverse anterior line geminate, outer portion broad and black, inner narrow and smoky, outwardly oblique, irregularly outcurved in the interspaces, the longest curve below vein 1. Transverse posterior line geminate on the costa, below which the outer portion is lost, the inner smoky, lunulate, with long outward venular points, only a little outcurved over cell, parallel with outer margin. Subterminal line indicated by irregularly placed paler scales, relieved by darker preceding scales. A series of blackish terminal lunules, followed by a pale line at base of fringes. Median shade line oblique between the ordinary spots and somewhat darkening the cell, thence, from the inferior angle of the reniform, close to and parallel to transverse posterior line, the intervening space becoming slightly dusky and giving the effect of a narrow darker band. Claviform small, very narrowly outlined by black scales. Orbicular a little paler than ground color, without powderings, of good size, narrowly black ringed. Reniform kidney-shaped, rather narrow, not powdery, not extending below cell, very narrowly black ringed. Secondaries even smoky gray, the veins hardly darker,

fringes paler with a yellow line at base. Beneath, dull gray, with a small dusky discal spot and a broad, diffuse, darker outer band, which is complete on both wings.

Expanse, 33 mm.=1.32 inches.

Habitat.—Laggan, British Columbia (Bean).

A single perfect male. The species is evidently allied to the *messoria* series, but has broader, more pointed primaries than usual, and the antennal processes are very small, the tufts of soft hair rather than bristles. These characters, as well as the dentate basal, and unusually irregular transverse anterior lines, will serve to characterize the species.

32. CARNEADES ONTARIO, new species.

Ground color dull, smoky fuscous. Head with a brown transverse line. Collar with a dusky transverse shade. Thoracic vestiture scaly hair, rather loose, neither tufts nor patagia well marked. Primaries rather powdery, median space a little darker, transverse lines blackish, not contrasting. Basal line geminate, broken in the cell. Transverse anterior line geminate, almost upright, irregular in the interspaces, inner part much less distinct than outer. Transverse posterior line geminate to the outcurve, then single, crenulate, a little drawn in. Subterminal line indicated by a few pale scales and a vague preceding shade which is fairly obvious in the costal region. A series of brown terminal lunules, followed by a very narrow pale line at base of fringes. Median shade line vaguely indicated. Claviform absent in the specimen. Orbicular indicated by a diffuse, undefined, pale blotch. Reniform marked by a blackish, oblong blotch, partly bounded by paler scales. Secondaries smoky, with a yellow tinge basally, veins and a discal lunule blackish. Fringes whitish. Beneath, primaries smoky, secondaries gray, both powdery, with a discal blotch and a broad diffuse outer shading.

Expanse, 33 mm. = 1.32 inches.

Habitat.—Sudbury, Ontario.

A single male, source not noted on the specimen. It is an ally of *laggana*, with similar wing form and general habitus, but much darker throughout, the antennæ having the joints much better marked. In fact, while at first sight the species are obviously similar, careful comparison shows numerous other distinctive points.

33. CARNEADES TESTULA, new species.

Ground color creamy gray, powdered with black. Collar with a faint, smoky, transverse line. Thoracic vestiture long flattened hair, patagia and tuftings only fairly evident. Primaries with all the markings powdery, obscured. Basal line geminate, broken, blackish, not well marked. Transverse anterior line geminate, rather diffusely marked on the costa, thence slender, the two parts equally evident, almost

upright, outwardly bent in the interspaces. Transverse posterior line geminate, blackish, evenly outcurved over the cell, a little incurved below, inner line best marked and lunulate, outer more diffuse and more faint, but also lunulate. Subterminal line irregular, broken, pale, marked on the costa by a preceding dusky shade, leaving the apex clear, and below this by blackish preceding or following powderings. A series of small, dusky, terminal lunules, followed by a yellowish line at the base of the fringes. A faintly marked, diffuse, dusky median shade darkens the space between the ordinary spots and crosses thence obliquely and evenly inward to the margin. Claviform small, the outline traceable by a few black scales only. Orbicular round or nearly so, concolorous, outlined by black scales. Reniform large, broad, kidney-shaped, concolorous, narrowly outlined by black scales. Secondaries dull grayish white, with a rather broad smoky outer border, the fringes whitish with a yellowish line at base; veins and a discal lunule smoky. Beneath gray, powdery, primaries darker, both wings with a discal spot.

Expanse, 36 mm.= 1.44 inches.

Habitat.—Calgary, Canada (Dod).

A single male, in good condition. This is an obscure powdery form allied to *laggana*, but with whitish secondaries and better-marked antennal joints. A distinctive character is the doubly lunate transverse posterior line, which is not shared with any of its allies.

34. CARNEADES DIFFORMIS, new species.

Ground color dull gray or smoky, powdery. Collar with a smoky median line. Thoracic vestiture hairy with some flattened hair intermixed, loose, patagia and tuftings well indicated. Primaries with the markings all coarsely written though not always distinct. Basal line geminate, black, slender, very close to base. Transverse anterior line outwardly oblique, outcurved between the veins and broken on them, geminate, inner part narrow, brown, rather even, outer black, broad, seeming rather a series of heavy black or brown curved marks than a line. Transverse posterior line geminate, evenly outcurved over cell and drawn in below, the outer line even, brown, the inner composed of thick black or smoky lunules separated by the gray veins. Subterminal line irregularly sinuate, gray, narrow, marked by a broad, irregular, smoky preceding shade, which may or may not be cut with gray on the veins, the terminal space more or less dusky powdered. A series of black or brown terminal lunules, fringes luteofuscous. An upright or slightly curved median shade crosses the wing between the ordinary spots and may darken the outer portion of median space. Claviform small, barely indicated or fairly evident. Orbicular moderate or rather small, round or nearly so, gray filled, outlined by black scales. Reniform moderate in size or rather small, kidney-shaped or tending to become a little constricted centrally, narrowly outlined by black scales, more or less smoky filled. Secondaries white with a yellowish tinge in the male,

smoky with a yellowish tinge in the female, veins and a discal lunule darker. In the male there is an evident exterior dusky line, more or less broken, beyond which the wing is somewhat smoky to the smoky terminal line. Fringes white in both sexes and in the male unusually long. Beneath whitish gray, rather even, with a distinct discal spot and a broad, blackish outer line nearly complete on all wings.

Expanse, 30 to 33 mm.= 1.20 to 1.32 inches.

Habitat.—Oregon (Schaus).

Two males and one female, all different. The female is best marked and the main points in the description are from that specimen. One of the males is similar but much more obscure, all the black being changed to smoky brown, and in neither of these is the median shade anything more than a vague suggestion. The second male is intermediate in distinctness of maculation save that the shadings to the subterminal line are obscured by a universal dusky shading, and here the median shade is present without doubt and darkens the space between the ordinary spots. These latter are large also in this last specimen, and I was at first strongly inclined to reject it as a member of this species. It agrees, however, in all other features, and particularly in the outer line of the secondaries above, which is not usual, and in the broad outer line of the under side.

The antennal processes in the male are unusually long, so that the brush-like structure is prominent.

35. CARNEADES DAKOTA, new species.

Ground color a sordid clay yellow, powdered with smoky. Head and thorax concolorous. Vestiture hairy, but coarse and somewhat flattened; the tuftings not obvious in the specimens. Primaries without contrasts, the ordinary maculation written in blackish. Basal line unusually distinct, geminate, the two portions well separated. Transverse anterior line upright or a little oblique outwardly, marked by geminate black spots on the costa, below which the inner line is lost, and the outer is made up of three interspaceal lunules preceded by a somewhat paler shade. Transverse posterior line geminate on the costa, the outer line becoming lost in the outcurve over cell, inner line slender, crenulate, very oblique inwardly below the cell and a little incurved. Subterminal line vaguely marked by a slightly darker subterminal shade. A series of smoky, interspaceal terminal lunules. Median shade broad, diffuse, smoky, almost upright, and crossing just inside the reniform. Claviform absent. Orbicular absent or marked by a dusky central dot. Reniform marked by a blackish or smoky kidney-shaped spot. Secondaries dirty-gray at base, smoky fuscous outwardly, fringes nearly white. Beneath whitish, powdery, both wings with outer lines and discal lunules.

Expanse, 32 to 34 mm.=1.28 to 1.36 inches.

Habitat.—Dakota: No definite locality.

Two males, neither in first-class condition. In vestiture and wing-form the species suggests *audentis*, which is a bright-colored form. The dusky reniform and obsolete or punctiform orbicular, combined with the other characters noted, should make this an easily recognizable form, though sordidly obscure in appearance.

Type.—Cat. No. 4790, U.S.N.M.

36. CARNEADES HOLOBERBA, new species.

Ground color dull smoky brown with a purplish shade. Head concolorous. Collar with a distinct black median transverse line surmounted by purplish gray. Vestiture of thorax mixed scales and flattened hair, patagia slightly relieved, anterior divided crest and posterior tufting distinct. Primaries with all the markings distinct, the lines black or blackish, but not contrasting against the dark ground, the included spaces a little paler and serving to relieve the defining portions. Basal line geminate, evenly outcurved, distinct throughout. Transverse anterior line upright or a little oblique outwardly, somewhat irregular, the inner line hardly darker than the ground; outer black. Transverse posterior line sharply bent on the costal vein, then parallel with the outer margin. Outer line even, hardly darker; inner black, lunulate, the points much more extended on the veins. Subterminal line distinct, paler, more or less broken, forming a feeble W on veins 3 and 4, marked by the slightly darker terminal space and a distinct, blackish brown preceding shade, which tends to break up into sagittate spots. A series of small, black, terminal lunules. Fringes concolorous. Median shade vaguely marked in one specimen. Claviform small, more or less completely defined by black scales, lightened by a few paler scales. Orbicular round or a little oval, small or moderate in size, paler in color and with a few darker, central scales. Reniform moderate, kidney-shaped, upright, incomplete above and below, black-margined within, outwardly with brown scales, a narrow, incomplete pale annulus relieving the spot from the slightly darker cell. Secondaries dull, smoky brown, fringes a little paler. Beneath smoky, powdery, with an outer line and discal spot, much better marked on the secondaries.

Expanse, 38 mm. = 1.52 inches.

Habitat.—Calgary, Canada, July 4 and 6 (Dod).

Two female specimens in good condition. The species resembles *brunneigera*, but is much darker brown, with a purplish tinge, and the lines are obviously geminate and even in general appearance.

37. CARNEADES KERRVILLEI, new species.

Ground color very pale, creamy gray, powdery. Head with a transverse blackish line across the middle, palpi blackish at sides. Collar yellow tipped, else blueish powdered. Thoracic vestiture mixed scales and hair, tuftings indefinite, yellow tipped, patagia gray powdered, somewhat relieved. A tuft of long white hair at base of abdomen.

Primaries with all the lines smoky, not contrasting. Basal line apparently single, interrupted, very close to base. Transverse anterior line upright or even a little inwardly oblique, inner line best marked, a little outcurved in the submedian interspace, outer line powdery, diffuse, leaving a rather wide included space. Transverse posterior line single, blackish, very even, only a little outcurved over the cell and rigidly oblique below it. Beyond this line the wing is a little darker powdered. Median line smoky, fairly defined, almost midway between the median lines and, as nearly as possible, parallel to them in course. Subterminal line blackish, broken into irregular spots, of which the largest is on the costa, in course only a little uneven. Terminal dusky lunules very small. Claviform wanting. Orbicular large, round, not defined, marked by a gray central powdering. Reniform of good size, kidney-shaped, somewhat faintly outlined by dusky scales, gray-filled inferiorly. Secondaries white, with a small discal lunule, and a narrow, smoky, powdery outer border. Fringes white. Beneath white, powdery, primaries a little darker, with a discal spot and a vague subterminal line; secondaries with a small discal lunule only.

Expanse, 36 mm. = 1.44 inches.

Habitat.—Kerrville, Texas (Dr. Barnes).

A single male, in good condition. The species is allied to *lineifrons* and the series related to it, but is not to be confused with either. The transverse lines divide the wing into five spaces which narrow regularly from the base outward, and all the lines are essentially parallel to each other. The ordinary spots are so obscured that they require a second look to be recognized, and this, with the peculiar mottling of creamy yellow and bluish gray scales, is distinctive. The anterior tarsi—all that remain—are annulate with black and the antennæ have the serrations not very much marked.

38. CARNEADES TERNARIUS, new species.

Ground color smoky fuscous, obscure, varying to red brown. Head with a brown or blackish frontal line. Collar with a feebly marked, dusky, transverse line. Thoracic vestiture mostly flattened hair with finer hair intermixed, patagia feebly marked, tufts obscure. Primaries with all the markings obscure, the blackish diffuse median shade being the most obvious feature. Basal line geminate, blackish, broken. Transverse anterior line geminate, upright, a little outcurved in the interspaces, blackish, broken, inner portion tending to become obsolete or entirely so. Transverse posterior line geminate, evenly outcurved over the cell, a little incurved below, outer portion even, sometimes obsolete, inner slender, crenulate, blackish. Median shade, broad, blackish, diffuse, crossing the middle of the wing and only a little curved outwardly. Subterminal line irregular, marked by a blackish subterminal shade which varies in distinctness, and is in one case altogether absent, the line itself being also lost in consequence. A black-

ish terminal line, tending to become lunulate, followed by a yellow line at base of fringes. The ordinary spots are practically obsolete, though the reniform may be traced by a vaguely paler shading and an equally vague, darker lunate mark. Secondaries smoky, a little paler at base, veins and a discal lunule smoky. Beneath gray to smoky, powdery, with or without a discal spot and outer line.

Expanse, 33 to 37 mm.=1.32 to 1.48 inches.

Habitat.—Denver, Colorado, October 9; Salida, July 10 (Oslar); Fort Collins, Colorado (Gillette); Colorado (Bruce).

Four specimens, all females and no two alike. It is indeed with some hesitation that I have associated them all under one name, but all agree in the practical absence of the ordinary spots, the dominant median shade, and the generally sordid, obscure coloring. The difference lies in the range between a distinct blackish shade defining the subterminal line, and its entire absence, the former being the type of the species. The shading of the secondaries in one specimen is distinctly darker. It will require a series containing males to settle the matter fully.

Type.—Cat. No. 4808, U.S.N.M.

39. CARNEADES NOCTUIFORMIS, new species.

Ground color a pale mouse gray, powdered with brown and blackish scales. Head with a broad brown transverse line. Collar inferiorly brown, surmounted by a black middle line, upper portion of the ground color. Thoracic vestiture mixed scales and flattened hair, patagia a little relieved, tuftings evident though not prominent. Basal line geminate, brown, outwardly margined by a brown shading in the submedian interspace. Transverse anterior line geminate, lines almost equally well defined, inwardly bent from costa to median vein and touching the orbicular, outcurved in the submedian interspace and with a long outcurve below vein 1 so that the margin is reached very close to its middle. Transverse posterior line not very well defined, geminate on the costa, but beyond that not well marked, even, outcurved over the cell, very close to the reniform and a little drawn in below. Subterminal line pale, irregular, not well marked, defined by a darkening of the terminal space which leaves the apex free, and by a dusky preceding shade which is best marked on the costa. A narrow, black, terminal line, followed by a yellow line at the base of the fringes. Median shade darkens the cell between the ordinary spots, then runs parallel with and rather close to the transverse posterior line, the space between becoming brown shaded and darker than the rest of the wing. Claviform evident, brown ringed, concolorous, moderate in size. Orbicular large, irregularly oval, oblique, open to the costa, outlined by black scales, annulate by a slightly paler ring, the center concolorous. Reniform large, broad, kidney-shaped, extending well below the median vein, black ringed, annulate by paler scales, center brown, with a yellowish median line.

The cell as a whole is dusky around the ordinary spots. Secondaries smoky, with a yellowish tinge, darker outwardly, discal lunule present, fringes whitish. Beneath gray, powdery, discal lunule and outer line indicated on primaries only.

Expanse, 35 to 36 mm. = 1.40 to 1.44 inches.

Habitat.—Siskiyou, California, September 11 (Henry Edwards); east Washington (Piper).

Two males. The type was received from Mr. Edwards several years ago and is in fair condition; the second example, from Washington, is rubbed and imperfect. It is darker throughout, the reniform has the inner margin drawn in so as to constrict it centrally and give it a flask shape, and the median shade line is not well marked. Otherwise I see no essential differences, and the examples agree in somewhat unusually long antennæ and in the shape of the primaries, which recalls *Noctua* rather than the more typical *Carneades*.

40. CARNEADES INTRUSA, new species.

In Bulletin No. 38, U. S. National Museum,[1] I called attention to what I then considered a variety of *tessellata*, and for which the term *intrusa* was suggested. With the material now at hand I have no hesitation in declaring the form entitled to specific rank. It resembles *tessellata* in general scheme of ornamentation, but the transverse anterior line is more upright, and the transverse posterior more evenly oblique below the middle of the cell. It is irregularly white powdered, and in each specimen the powdering is more prominent in a different space. In one it brightens the subterminal space, in another the costal region, in a third the basal space, and in the fourth the lower half of the median space. The powderings are coarse and not very close. The ordinary spots are more or less filled with these coarse white scales, and the reniform is outwardly shaded with yellow.

Expanse, 30 to 33 mm. = 1.20 to 1.33 inches.

Habitat.—Sierra Nevada, California.

Specimens labeled as above are in the U. S. National Museum collection, the Edwards collection, and the Rutgers College collection.

Type.—Cat. No. 4717, U.S.N.M.

41. CARNEADES NEOTELIS, new species.

Ground color red-brown, more or less shaded with ash-gray. Head with a black or brown line across the middle of the front. Antennæ with a discolored red, yellow, or gray tuft at base. Collar with a deep-brown median line, gray margined above, tending to become diffuse inferiorly; the base of the primaries usually marked by a discolored yellow or gray tuft. Thoracic vestiture mixed scales and flattened hair, patagia evident, tuftings distinct and tending to become discolored.

[1] Page 192.

Primaries very uniform in general tint, no strong contrasts, markings all present, but tending to become broken. Basal line geminate, black, with yellow included scales, broken in the cell. Transverse anterior line geminate, brown or black, outwardly oblique and outcurved in the interspaces; outer portion distinct, inner portion much less marked, included space gray. Transverse posterior line geminate, blackish or brown, evenly curved over cell and a little drawn in below; outer portion even, tending to become lost, inner more or less evidently lunulate and not prominent. Subterminal line yellowish, irregular, broken, sometimes consisting of scattered yellow scales only, usually marked by preceding darker or blackish spots tending to unite, and by a preceding shade on costa. The terminal space, save at apex, is a trifle darker. A black terminal line, tending to become lunulate, is followed by a narrow yellow line at the base of the fringes. A feebly marked median shade is evident in most specimens, outwardly oblique between the ordinary spots and a little irregular, but close to and parallel with transverse posterior line below that point. Cell between the ordinary spots a little darker. Orbicular large, gray, oval, oblique, outlined by black scales. Reniform large, broad, upright, kidney-shaped, extending below the cell, outlined by black and annulate by pale scales, invaded by a yellow shade at the middle of the outer margin, else a trifle darker than the ground, a leaden shade becoming marked inferiorly. Claviform small or moderate, incompletely outlined, never prominent. Secondaries, smoky white in the male; darker, with a yellow shade in the female; darkening outwardly, veins and a narrow discal lunule also darker. Fringe whitish, with a yellow line at base and a smoky interline. Beneath, ranging from dirty white to smoky gray, powdery, discal spot and outer dusky line more or less obvious or complete on all wings.

Expanse, 36 mm. = 1.44 inches.

Habitat.—Pullman, Washington, July (Piper); Colorado (Bruce).

Two males and two females, remarkably similar in size and not much different in other respects. There is a little variation in the shade of brown and a little in the shade of the ornamental lines, but otherwise nothing. The species is perhaps near to *insulsa*, but lacks the strong contrasts and prominent claviform. It has the reniform of *tessellata* and becomes confusing by the presence of a fairly obvious median shade, combining thus the characters of two series.

Type.—Cat. No. 4796, U.S.N.M.

42. CARNEADES ATROFUSCA, new species.

Ground color mouse gray, varying to brown, always even. Head and thorax concolorous, vestiture an admixture of flattened hair and scales, the tuftings evident on well-preserved specimens. Collar with a rusty transverse shading, which is sometimes relieved by black scales, forming an apparent black line. Where this shade reaches the base of

primaries, it forms a tuft of yellow scales, most obvious in the male and not always present. Primaries with the median lines obscured and no strong contrasts. Basal line geminate, sometimes marked on the costa only, but often complete and relieved by yellow, included scales. Transverse anterior line geminate, usually traceable by black or smoky scales across the wing; in course a little outwardly oblique, and slightly outcurved in the interspaces. Transverse posterior line geminate, traceable with difficulty in some examples, obsolete in others. Subterminal line pale, irregular, always broken, usually only scattered yellow scales, which are often altogether absent. Sometimes the yellow scales are emphasized by preceding black atoms, and in one case the line is marked by a somewhat deeper preceding shade. Terminal line narrow, black, relieving a yellow line at the base of the fringes. Claviform small, traceable in all the specimens, not complete in any. Orbicular large, oval, irregular, oblique, concolorous, more or less completely outlined by black scales, within which, in some specimens, yellow scales tend to bring it into relief. Reniform large, kidney shaped, extending below the cell, more or less imperfectly outlined by black scales, and usually better defined by an inner ring of yellow or whitish scales, which may invade the spot centrally. Usually the center is concolorous, but it may be slightly darker. Secondaries dirty yellowish white, outwardly smoky, the female more yellowish, with a broader soiled margin, discal lunule evident, fringes white, with a yellow line at base and a smoky line beyond this. Beneath gray, powdery, with the usual tendency to an outer line and a discal spot on all wings.

Expanse, 32 to 35 mm. = 1.28 to 1.40 inches.

Habitat.—Glenwood Springs, Colorado, August, September, October (Barnes); Colorado (Bruce); Pullman, Washington, July (Piper).

Six males and four females are at hand. They vary from a mouse gray to a red brown in ground color, and from almost immaculate to a type in which all the markings can be traced by darker or paler scales. The best-marked specimen resembles a normal *tessellata* without the black, and in fact this species resembles the common form when all its characteristic markings have been washed out. It is perhaps even closer to *satis*, which is larger, better marked, has a black line across the collar, and a broken, black, longitudinal line at base.

Type.—Cat. No. 4798, U.S.N.M.

43. CARNEADES OBJURGATA, new species.

Ground color red brown, more or less overlaid by violet scales, less marked in the male, which tends to rusty shadings. Head violet in the female, often rusty in the male, palpi dusky at the sides. Collar with a brown or blackish median line, which is margined above by violet scales, inferiorly a little paler or even rusty yellow, in which case there is a patch of rusty scales at the base of the primaries. Primaries with all the markings present, the surface powdery and mottled with black,

gray, brown, and yellow scales. Basal line geminate, black, both portions equally distinct, usually pale filled, outwardly angulated on the median vein, beneath which a line of black scales may connect this angulation with the transverse anterior line. Transverse anterior line geminate, diffuse on the costa, outer part broad, black; inner narrower and blackish; included line always paler and sometimes yellowish; in course outwardly oblique, with outcurves in the interspaces. Transverse posterior line geminate, inner blackish, lunulate rather than crenulate, the outer smoky, even; its course is a rectangular bend over the cell, and then parallel with the outer margin or a little incurved to the inner margin. Subterminal line always evident, pale, sometimes punctiform, usually marked by the darker terminal space, and sometimes by a preceding broken or continuous shade as well, forming a small W on veins 3 and 4 when best marked. Median shade quite distinct, oblique between the ordinary spots, then rather close to and parallel with the transverse posterior line to the margin. Claviform moderate or small, concolorous, often incomplete, but always at least partly outlined in black. Orbicular moderate or large, oblique, oval or irregular, more or less completely black ringed, annulate with violet or yellowish, the center paler than the ground, so that the spot is relieved without being really contrasting. Orbicular large, kidney-shaped, extending well below the median vein, laterally outlined by black scales, incomplete above and below. An annulus of yellow or violet scales lies within the black margin, and these scales encroach from the concave outer border and sometimes nearly divide the spot. The center is of the ground color, but darkens inferiorly, and it may be relieved by a pale central lunule. There is a series of black terminal lunules, and a pale line at the base of the fringes. Secondaries soiled whitish, with a smoky outer margin, broader and darker in the female, the yellowish tinge very faint, yet perceptible. Beneath gray, powdery, with the usual outer line and discal spots all more or less evident. Thoracic vestiture an admixture of scales and flattened hair, patagiæ relieved, tuftings well marked.

Expanse, 32 to 36 mm. = 1.28 to 1.44 inches.

Habitat.—Pullman, Washington, July and August (Piper); Dakota.

Size and general habitus of *tessellata* without the black filling, and much mottled and powdered; more like *friabilis*, but smaller and somewhat shorter winged, not so evenly gray. The male seems to resemble *tessellata* most nearly in habitus, whereas the female tends rather to *messoria* in the better-defined median shade. Ten specimens, equally divided as to sex, are under examination.

Type.—Cat. No. 4804, U.S.N.M.

44. CARNEADES CARIOSUS, new species.

Ground color rather dull, smoky brown, shading to gray. Head a little paler inferiorly, palpi dusky at the sides. Collar paler below, a more

or less obvious blackish line above the middle; the point where the base of the primary joins the thorax marked by yellow scales. The anterior divided crest and posterior tufting evident. Primaries a little powdery, markings all present, but diffuse and not clearly written. Basal line geminate, black, inner complete, bent on the median vein and running in on the submedian so as almost to reach the base. Transverse anterior line geminate, outer portion black, distinct, inner smoky, scarcely evident, both portions broken in the costal space. As a whole the line is a little oblique outwardly, and is outcurved in the interspaces. Transverse posterior line geminate, inner part black and lunulate, outer smoky and even. As a whole the line is well removed outwardly, leaving a wide median space; is very slightly outcurved over the cell and is almost evenly oblique or a very little incurved below. Subterminal line pale, irregular, marked chiefly by a preceding dusky shade in the subterminal space, and by the slightly darker terminal space below the apex. There is also a somewhat dusky, indefined, preceding shade, which may be broken into irregular blotches; but is never contrasting. Terminal line narrow, black, broken, the base of the fringes a little yellowish. Median shade quite well defined, smoky, darkening the cell somewhat between the ordinary spots, and running parallel to and well removed from transverse posterior line below the reniform. Claviform concolorous, moderate in size, narrow, incompletely black margined. Orbicular of good size, oblique, irregular, oblong rather than oval, black ringed except on costal vein, a white inner annulus relieving the concolorous center. Reniform large, kidney-shaped, extending below the median vein, outlined by black scales except above and below, better defined by a whitish annulus, which is somewhat emphasized by yellowish scales exteriorly; center dusky, with a powdering of yellow scales toward the middle. Secondaries pale, smoky yellowish, more whitish toward the base, fringes white tipped, yellowish at base, smoky interlined, cell closed by a smoky lunule. Beneath whitish, with black powderings, a more or less evident common outer line and a discal lunule.

Expanse, 32 to 34 mm. = 1.28 to 1.36 inches.

Habitat.—Pullman, Washington, July 18 to 24 (Piper).

Two males and one female; the latter the largest and with a grayish shading. The species is somewhat stumpy winged in appearance, and resembles what I have determined as *friabilis*, save that it is smaller and not ash gray in ground color.

Type.—Cat. No. 4801, U.S.N.M.

45. CARNEADES MALIS, new species.

Ground color a bright bluish gray, through which a faint reddish shade is noticed in the center of primaries. Head brown. Thoracic vestiture mostly flattened hair, tuftings feebly indicated, patagia not marked. Primaries with the maculation generally obscured, except for

the contrasting black filling of the cell about the ordinary spots. Basal line black, geminate, distinct. Transverse anterior line marked by geminate brown costal spots; below this it is single, slender, brown, scarcely contrasting, outwardly oblique and outcurved in the interspaces. Transverse posterior line marked by geminate brown spots on the costa, else obsolete. Subterminal line marked by a preceding costal shade and by the slightly dusky terminal space, the apex being clear. A slender brown terminal line is followed by a yellowish line at the base of the fringes. Claviform wanting. Orbicular large, oblique, incomplete above, annulate with pale, else concolorous. Reniform large, kidney-shaped, extending well below the cell and seemingly much too large for the insect; not outlined except by the black filling of the cell and the blackish filling of the spot which defines it against the ground color. Secondaries white, veins yellowish, marginal line smoky. Beneath, primaries gray, secondaries white, both powdery with a discal spot and with a punctiform outer line.

Expanse, 29 mm. = 1.16 inches.

Habitat.—Brandon, Manitoba, October 27, 1898 (Hanham).

A single male only, under No. 426, of this pretty little species which recalls the Texas *Noctua pellucidalis*. In *Carneades* its nearest ally is *albipennis* Grote.

46. CARNEADES PINDAR, new species.

Ground color an even brownish gray. Head somewhat paler, more fawn gray, palpi blackish at sides. Collar fawn gray inferiorly, brownish above, with a contrasting black line between the shades. Thoracic vestiture mostly flattened hair, patagia hardly relieved, tuftings indistinct, no markings. Primaries with the costal region a little paler, terminal space smoky brown, cell before and between the ordinary spots black or blackish, basal space with a black streak below the median vein, becoming diffuse outwardly, else very smooth, not at all powdery. Basal line marked by geminate smoky dots on costa and by a pale shade interrupting the basal streak below the cell. Transverse anterior line geminate, very feebly defined, almost upright to vein 1, below which it makes a long outcurve. Transverse posterior line geminate, very slightly darker, inner portion lunulate, outer even, as a whole almost parallel with the outer margin. Subterminal line concolorous, marked by the dark terminal space, which leaves the apex pale, and a preceding shade which is best marked on the costa and then breaks up into black or blackish sagittate interspaceal marks. A series of small, black, terminal lunules, from which blackish rays are sent inward to oppose the sagittate preceding marks. Claviform of good size, concolorous, narrowly black-ringed. Orbicular oblong, oblique, large in size, open to the costa, else black-ringed, concolorous. Reniform of good size, kidney-shaped, black-ringed, concolorous. Secondaries whitish with a faint luteous tinge, outer margin narrowly smoky, the border becoming

diffuse inwardly. Beneath whitish, powdery, both wings with a smoky discal spot.

Expanse, 34 to 36 mm. = 1.36 to 1.44 inches.

Habitat.—Bluff, Utah (Mrs. H. M. Peabody).

Two males from the U. S. National Museum, in not the best of condition. The species is allied to *obeliscoides* in type of maculation, but has no contrasts and does have a well marked subterminal line preceded by sagittate black marks. From the protean forms of *perexcellens* I believe it to be safely distinguished by the form of the ordinary spots and their uniformity with the ground color.

Type.—Cat. No. 4789, U.S.N.M.

47. CARNEADES HENRIETTA, new species.

Ground color red brown, more or less evidently overlaid by gray scales. Head variable, but usually of the color of the inferior portion of collar. Collar with a distinct, black, median transverse line, above which is the ground color of the wing and below which the color is usually contrasting gray, yellow, or brown; but it may be concolorous with the ground. Primaries may be entirely uniform in color or the costal region may be contrastingly yellowish or rusty luteous to the transverse posterior line. All the lines incomplete and sometimes barely traceable. Basal line usually marked by geminate dusky spots on the costa, and by black spots in the submedian interspace; a black longitudinal mark extending from this point to the transverse anterior line. Transverse anterior line geminate, outwardly oblique and well outcurved in the interspaces, so that it reaches the inner margin not much within its middle, interrupted in the costal region. The inner part of line is scarcely defined, the outer is black, included space usually a little paler. Transverse posterior line geminate on the costa, thence single, fine, crenulated, rarely complete, sometimes marked only by the contrast between subterminal and median spaces, sometimes scarcely more than indicated. Subterminal line pale, slender, more or less broken, a little toothed on veins 4 and 5, sometimes marked by the darker terminal space, sometimes by a few preceding scales, and sometimes not at all. A series of interspaceal terminal points, sending brown rays across the terminal space which, when darker, leaves the apex pale. Subterminal space usually a little paler and sometimes obviously contrasting. Veins dusky. Median cell more or less black powdered before and between the ordinary spots. Claviform variable in size, outlined in black, sending from its tip a narrow black line through the submedian interspace and above this a paler ray to the transverse posterior line. Orbicular oval, moderate or large, incomplete above, else black ringed, inwardly relieved by a pale annulus, the center concolorous or paler. Reniform large, kidney-shaped, oblique, black ringed, annulate with yellowish, the center a mixture of yellowish and blackish scales in varying proportions. Secondaries whitish, with a

faint yellowish tinge in the male, more smoky in the female, with a dusky outer line, from which a very narrow shade may or may not extend irregularly inward. Discal lunule faintly marked. Beneath gray, powdery, secondaries more whitish, all wings with an incomplete outer line and a discal spot.

Expanse, 30 to 34 mm.=1.20 to 1.36 inches.

Habitat.—Alameda County, California, September (U.S.N.M.); Santa Cruz Mountains (Ehrhorn); Senator, Arizona, June 25 (Dr. Barnes).

Five males and two females, no two alike. This species has approximately the same range of variation as *perexcellens* Grote=*infelix* Smith, but it is decidedly smaller, the wings are broader, more stumpy, there are no sagittate spots preceding the subterminal line in the contrasting individuals, and, altogether, the species differs so obviously in habitus that there seems little danger of confusion.

Type.—Cat. No. 4806, U.S.N.M.

[*Larva.*—Head bilobed, broad, clypeus broadly triangular, rather high, the paraclypeal pieces nearly attaining the vertex; pale brown, speckled with darker over the sides and at the top of each lobe; labrum pale, jaws dark at tip, ocelli in a brown patch; width, 3.5 mm. Body somewhat flattened, robust, feet normal, but all small and short; tubercle iv of joints 9 and 10 at the upper corner of the spiracle. Thin skinned, translucent whitish, the dorsum faintly shaded with reddish. Cervical shield distinct, brown, with brown impressed strigæ, cut by three white bands; anal plate obscure, brown dotted. Spiracles black. Tubercles moderately large, brown, obscure. No marks in the blown example.

"On roots of various plants" (Kœbele, No. 94).—*Harrison G. Dyar.*]

48. CARNEADES VANIDICUS, new species.

Ground color luteous with a slight reddish tinge, in the female so heavily shaded with gray as to seem smoky or ashen. Head of the palest ground color, the tip of the frontal vestiture sometimes a little darker. Collar with a rather narrow black median transverse line, below which it is paler and, usually, contrastingly discolored. Thoracic vestiture mixed scales and flattened hair, patagia relieved, dorsal crest and tuftings distinct, and in the male a little discolored. Primaries with the costal region pale, discolored, gray (female) to yellow (male), a pale streak through the submedian interspace and another from the middle of the reniform outward and curved upward to the apex. Basal line marked only by the pale included space below the median vein, where it breaks the longitudinal black shading, which extends to the transverse anterior line. Transverse anterior line geminate, marked by smoky spots on the costa and by an obliquely outward curve in the submedian interspace. Transverse posterior line practically obsolete in most cases or only marked opposite the cell by the somewhat darker median space, in one female traceable for its full course, and there a little incurved. Veins

more or less marked by dusky scales, the median also accompanied by a series of pale scales. Subterminal line pale, defined by the uniformly dusky terminal space and by a series of variably evident sagittate black spots or dashes. A series of brown or blackish lunules, beyond which the fringes are pale, with a narrow, dusky, interline. Claviform distinct, pointed, usually reaching the center of the wing in the female, a little shorter in the male, and sending off a slender black line from its tip through the submedian interspace. Orbicular oblique, oval or oblong, moderate in size, usually incomplete above, defined by a narrow black ring, within which is a paler annulus, the center of the ground color or paler. Reniform large, kidney-shaped, scarcely extending below the median vein, black ringed, annulate with pale, with a dusky center, which may be encroached upon by pale scales; there is a tendency to a little backward spur along the median vein from the lower margin of the spot. Cell, except for the ordinary spots, filled with smoky or black. Secondaries whitish in the male, with a narrow, smoky, outer border; smoky gray and almost uniform in the female; fringes white in both cases. Beneath whitish, powdery, disk of primaries smoky and with a distinct discal spot and incomplete outer line. Secondaries paler, with a small discal spot only.

Expanse, 31 to 35 mm. = 1.24 to 1.40 inches.

Habitat.—Phœnix, Arizona, November 4 to 11 (Griffith); Pullman, Washington, September 27 (Piper).

Seven specimens, of which half are male and half are female, one example being the most complete possible example of a union of both sexes. The left side from the median line of the body is completely male, the right side is as completely female. Ovipositor and claspers are both present and the differences in antennal structure is marked. The two pairs of wings afford a perfect illustration of the sexual color differences and make it certain that the two are correctly associated.

So far as the material indicates, the variation is mostly sexual, the male being in all respects the brighter, with greater contrasts and a predominating yellow shade. The female is more uniformly gray, and the contrasts are not nearly so great, the costal region seeming whitish rather than yellow.

The species is allied to *perexcellens;* but is smaller, with differently shaped ordinary spots and much whiter secondaries. From *henrietta* it is distinguished by more pointed primaries, much stronger color contrasts, the sagittate spots before the subterminal line, and the form of the ordinary spots.

Type.—Cat. No. 4807, U.S.N.M.

49. CARNEADES FŒMINALIS, new species.

Ground color ashen gray, shaded with smoky or blackish. Head gray inferiorly, vertex smoky brown. Collar with a broad, black median band which is tipped with gray and below which there is a reddish

tinge. Thoracic vestiture mostly flattened hair, patagia marked and edged with gray scales, tuftings obvious. Primaries with costal region contrastingly gray or whitish, this shade invading the orbicular and, to some degree, the reniform as well as, occasionally, the inner margin. Basal line marked by a smoky costal spot only. Transverse anterior line geminate, marked on the costa, obsolete through the cell, then very obliquely outcurved in the interspaces; outer portion blackish, evident, inner smoky, obscure, defined chiefly by the somewhat paler included space. A black or blackish shade defines the pale costal space from the base to the transverse anterior line and this shade continues so as to fill the cell around the ordinary spots and the median space above vein 2. Transverse posterior line geminate on the costa, thence single, very slightly crenulate, broadly curved over the cell, well incurved below. Subterminal line gray or whitish, irregular, broken, terminal space darker except at apex, preceded by a dusky subterminal shade, which is best marked on the costa and tends to break up into somewhat triangular spots. There is a faint, terminal, blackish line. Claviform moderate, black ringed, sometimes concolorous, sometimes gray, and sometimes the margins almost join to make it solidly black. Orbicular narrow, oblique, oblong rather than oval, varying in size, gray-filled. Reniform moderate in size, kidney-shaped, not extending below the median vein, black margined, then annulate with white, the center concolorous and variably gray powdered. Secondaries white with a smoky tinge in the male, darker and with a more yellowish shade in the female; fringes white, veins and a discal lunule dusky.

Expanse, 31 to 37 mm.=1.24 to 1.48 inches.

Habitat.—Garfield County, Colorado, 6,000 feet (Bruce).

Two males and two females; one of the latter apparently a little dwarfed and crippled, which accounts for the range of size variation; the other examples are 35, 36, and 37 mm., respectively. The species is allied to *furtivus* or *idahoensis*, but has none of the red or brown shading, and the transverse posterior line is complete. Aside from this the form of the ordinary spots differs, and this new species has the markings much more obvious and is less even in appearance.

Type.—Cat. No. 4784, U.S.N.M.

50. CARNEADES NORDICA, new species.

Ground color smoky brown, with a more or less obvious red shading, the female with a gray shading over all. Head with a dusky frontal line across the middle. Collar with a distinct black median line, which is tipped with gray; in the male a reddish or rusty shade predominates below this line and leaves a rusty patch at the base of the primaries; in the female a gray shade replaces the red. Thoracic vestiture mixed, patagia defined, tuftings distinct and a little gray tipped. Primaries with the costal region gray to the transverse posterior line, this shade invading the orbicular and to some extent the subterminal space. The

cell is black filled around the ordinary spots, and a blackish shading is in the basal space below the median vein, shading to the ground color inferiorly, sharply limited above. Basal line marked by geminate black spots on the costa, and by a gray line interrupting the black below the median vein. Transverse anterior line geminate, interrupted by the pale costal shade, outwardly oblique and outcurved in the interspaces below that point. Transverse posterior line geminate, the inner line crenulate, outer even and not so well marked; as a whole, evenly curved over the cell and a little drawn in below. Subterminal line pale, irregular, a little dentate on veins 3 and 4, defined by the dusky terminal space which leaves the apex of the ground color, and a dusky preceding shade which is best marked on the costa and is more or less broken into undefined spots elsewhere in its course. A broken blackish terminal line, followed by a yellow line at the base of the fringes. Claviform black ringed, variable in size, though never very large; a fine black line from its tip through the submedian interspace and a slightly paler shading above it. Orbicular oblique, oval or oblong, open to the costa superiorly in the female, incompletely closed in the male. Reniform upright, kidney-shaped, of good size, hardly extending below the cell, defined by a gray annulus and the center more or less gray powdered. The median vein is gray to the reniform, and a powdering of gray scales is variably evident along the inner margin. Secondaries smoky, more yellowish at the base, darker in the female, fringes whitish. Beneath, primaries smoky, secondaries gray, powdery; all with an incomplete outer line and a discal lunule, the latter usually obsolete on the primaries and sometimes so on the secondaries.

Expanse, 35 to 38 mm.=1.40 to 1.52 inches.

Habitat.—Calgary, Canada, July 16, 19, August 3 (Dod); Olds, British Columbia (Fletcher).

Two males and two females. Is an ally of *divergens* and has the pale median vein; but the ordinary spots are not outlined in pale and are different in shape, opening on the pallid costa. This is also a much grayer species and the contrast are more sharply marked. It has a little the appearance of *furtivus*, but the powdery markings and complete median lines easily distinguish it.

Type.—Cat. No. 4786, U.S.N.M.

51. CARNEADES FACTORIS, new species.

Ground color fawn gray, more or less brown shaded. Collar with a transverse black median band which is diffuse inferiorly, and tends to darken the lower portion centrally. Thoracic vestiture mixed scales and flattened hair, patagia fairly defined, tuftings obscure. Primaries with all the markings somewhat broken, median space a little darker red brown, costa a little more shaded with gray, cell yet darker or blackish before and between the ordinary spots. Basal line geminate, marked by black spots on the costa and by the paler included shade

which cuts the black or brown basal shade. This black or brown shade extends below the median vein from base to transverse anterior line and is diffuse inferiorly. Transverse anterior line geminate, outer portion black, lost in the costal region; inner brown, not much contrasting, included space gray; in course it makes an inward bend from costa to median vein, then outcurved to vein 1, below which it has another, longer, outcurve. Transverse posterior line geminate, outer line even, hardly darker, tending to become lost, the inner lunulate, black or brown, included space a little brighter red, as a whole quite evenly outcurved over the cell and a little drawn in below. Subterminal line narrow, yellowish, more or less broken, only a little irregular in course, defined by the paler apical space and marked by small, irregular and somewhat diffuse brown spots. Terminal line very narrow, brown, followed by a yellow line at the base of the fringes. Claviform rather short and broad, black ringed, usually a little incomplete, tending to become brown filled. Median vein gray marked. Orbicular irregular, oblong, oblique, open superiorly, but not merged into the costal shade; narrowly annulate in pale gray, as a whole lighter than ground. Reniform moderate, rather narrow, irregularly kidney-shaped, scarcely extending below the cell, defined by black scales within which is an imperfect ring of pale scales; evenly filled with lighter gray. Secondaries an even, smoky yellowish, veins and discal lunule darker, fringes pale, with a yellow line at base. Beneath, ranging from whitish to smoky gray, powdery, with or without discal spots and outer lines on all wings; no two specimens being alike.

Expanse, 33 to 40 mm. = 1.32 to 1.60 inches.

Habitat.—Glenwood Springs, Colorado, June, July, and August (Dr. Barnes).

Five females in fair condition only. The range of variation is chiefly in size and in the amount of contrast between the ground color and the dark shadings in the median space and cell.

The species is allied to *divergens* but is more even in color, with less contrast on the median vein and pale rings surrounding the ordinary spots, and with quite different transverse anterior line and orbicular.

Type.—Cat. No. 4795, U.S.N.M.

52. CARNEADES CÆSIUS, new species.

Ground color reddish brown, washed with blue gray. Head rich red-brown, verging to carmine. Collar blue gray, with a carmine transverse line above the middle. Thorax very robust, mixed thin and flattened hair, patagia well marked and brown, tuftings prominent, blue gray. Primaries mostly blue gray. The inferior half of basal space, the claviform, and the filling of the ordinary spots is brown. The terminal space save apex and the subterminal shading are smoky. Basal line indicated only below the cell, where it cuts the black shade which extends to transverse anterior line, but is not prominent. Trans-

verse anterior line marked as a gray line through the submedian interspace only. Transverse posterior line marked on the costa and traceable over the cell by the contrasts between the brown and gray, lost below that point. Subterminal line distinct, gray, marked by a preceding smoky costal shade, and thereafter by the smoky terminal space and a preceding, continuous, smoky shade. A narrow, lunulate, black terminal line, followed by a yellow line at base of fringes. Claviform very large and broad, reaching to the middle of the wing. Orbicular round, of good size, broadly ringed with blue gray. Reniform large, broad, kidney-shaped, broadly ringed with gray. The median vein is prominently gray. Before the orbicular is a triangular black spot, and the space between the ordinary spots is black. Secondaries dirty yellowish at base, becoming smoky outwardly, veins and a discal lunule smoky. Fringes yellow at base, smoky at middle, white at tips, disc with a discal spot and a subterminal dusky line. Secondaries with a dusky lunule and a dusky costal and outer border.

Expanse, 34 mm. = 1.36 inches.

Habitat.—Middle California (Dr. Barnes).

A single female of this bright little species. The body is unusually robust and the wings are in consequence actually and proportionally small or "stumpy." It should be associated with *redimicula*, where it will be easily separated from the described species.

53. CARNEADES ACUTIFRONS, new species.

Ground color dark red brown, shaded with black and pale gray. Head brown with a black transverse line, the frontal protuberance being more acute than usual in the genus. Collar with a black central line, below which it is very pale gray, tinted with yellowish, and above which it may be reddish or of the ground color. Thoracic vestiture with long flattened hair and scales intermixed, tuftings distinct and a little reddish anteriorly, patagia defined, disk blackish, margin indicated by reddish scales. Primaries well marked with strong contrasts; costal region gray or whitish to the transverse posterior line, apex paler, cell, except for the pale ordinary spots, black filled. Basal line geminate, black, marked on the costa and again in the submedian interspace where the whitish included shade cuts the black shade which extends to the transverse anterior line. Transverse anterior line geminate, black, broken, inner line not well marked, included space pale, outwardly oblique, and outcurved in the interspaces. Transverse posterior line geminate on the costa, inner line slender, black, a little lunulate, tending to become lost, squarely exserted over the reniform, very oblique and a little incurved below. Subterminal line slender, whitish outwardly, dentate on veins 3 and 4, preceded by a dusky shading, partly broken into black dots or spots, and by a broader costal shading. Terminal space save apex darker. A slender black terminal line, followed by a pale line at the base of the fringes. Claviform prominent,

moderate or large, so broadly outlined in black that it is almost black filled. Orbicular ovate, irregular, oblique, small, outlined in black filled with whitish or gray scales which may be brown centered. Reniform large, kidney-shaped, extending well below the cell, more or less discolored by white, gray, or yellow scales. As a whole the lower half of the wing is the lighter and it may be quite contrastingly gray. The subterminal space is on the whole a little lighter than either median or terminal spaces. Secondaries pale, soiled yellowish at base, darker, smoky, outwardly, veins and a narrow discal lunule also smoky. Beneath smoky, powdery, with common discal spot and outer band.

Expanse, 33 mm.=1.32 inches.

Habitat.—California; Oregon.

One male and one female for which I have no more definitive locality than above given. The specimens are old, but in good condition.

The species stands by itself by the unusually narrow primaries and very oblique outer margin. Though of almost average expanse it seems like a very small species and indeed is the smallest of those with contrasting costa, discolored spots, and basal black markings.

Type.—Cat. No. 4794, U.S.N.M.

54. CARNEADES SELENIS, new species.

Ashen gray over a somewhat luteous base. Head and collar inferiorly with a luteous shade. Collar with a distinct black line at middle, above which it is gray. Thoracic vestiture mixed scales and hair, tuftings evident, patagia marked and with a narrow, black submargin. Primaries with the median lines not relieved, barely traceable; terminal space and a prominent shade preceding subterminal line smoky, blackish. Basal line geminate, barely traceable to the slender, black, basal line which is with difficulty traceable to the transverse anterior line. The latter is geminate, outwardly oblique and outcurved in the interspaces. Transverse posterior line evident on costa and through the abrupt outward bend over the cell; below that point it is just traceable as being parallel with the outer margin. Subterminal line very distinct, broad, yellowish, preceded by a blackish, smoky shade, which tends to break up into triangular spots. A series of small terminal lunules, beyond which there is a narrow pale line at base of fringes; a median dusky line, being narrowly cut with white. Median shade vaguely diffuse below the reniform. Claviform long, slender, a little paler, outlined in blackish scales which do not form a continuous line. Cell smoky before and between the ordinary spots. Orbicular small, oval, ringed with black scales, annulate with pale, center of the ground color. Reniform small, kidney shaped. Center and interior portion filled with blackish, elsewhere narrow black margined and with a yellowish annulus. Secondaries white, with a rather broad, smoky margin. Beneath whitish, powdery, primaries with a discal spot and the outer margin somewhat dusky, secondaries powdery along the costa only.

Expanse, 31 mm. = 1.25 inches.

Habitat.—Los Angeles County, California (Coquillett).

A single female, from the collection in the U. S. National Museum. It is an ally of *silens*, but much smaller, with small ordinary spots and very sharply marked subterminal line. It recalls *atrifera* in size and habitus, but is quite distinct.

55. CARNEADES LAMINIS, new species.

Ground color dull fuscous, primaries washed with ashen gray. Head brown. Collar with a rusty shade at base, reaching the insertion of the wings, margined above with a broad, black central line. Thoracic vestiture mostly flattened hairs, patagia and tuftings obvious. Primaries gray along the costal region halfway across subterminal space, the cell smoky, darker than any other part of the wing. A thread-like black line extends from base to the transverse anterior line, shaded a little with smoky. Basal line geminate, blackish, broken in the cell. Transverse anterior line geminate, smoky, obscure, outwardly oblique, outcurved in the interspaces, lost in the cell, and feebly marked below internal vein. Transverse posterior line geminate on the costa, single below the cell, fine, crenulate, sinuate, not relieved. Subterminal line gray, irregular, dentate on veins 3 and 4, defined by the dark terminal space except at apex, which is clear, and by a preceding shade which fills the subterminal space on costa and is broken and more or less punctiform below the middle of the cell. A series of small black terminal lunules, followed by a yellow line at base of fringes. No median line. Claviform barely indicated. Orbicular small, irregular, oblique, gray, centered with smoky, partly outlined by black scales. Reniform moderate, kidney-shaped, gray, powdered with smoky, inwardly defined by black scales, outwardly by the dusky space beyond it; above and below not defined. Secondaries dirty yellowish white, with a smoky outer border; veins and a narrow discal lunule, smoky. Fringes yellow at base, with a brown central line, white at tip.

Expanse, 34 mm. = 1.36 inches.

Habitat.—Middle California (Dr. Barnes).

A single male in good condition. The species resembles a small *tesselloides*, but is not nearly so well defined and has a dull smoky brown tinge not found in the older species. The ordinary spots are also different and the collar in *tesselloides* is bright ashen gray inferiorly, not rusty. Altogether this is a darker species and more sordid.

56. ANYTUS ATRISTRIGATUS, new species.

Ground color gray with a variable smoky tinge. Head with smoky frontal and interantennal lines. Collar black tipped. A blackish band from the eyes to the base of the primaries. Patagia margined with blackish. Primaries with all the markings defined, a peculiar and prominent feature being a black streak, which extends from base

to the outer margin through the submedian interspace, the line set in a blackish shading, which extends on each side and is diffuse at the edges. Basal line blackish, geminate, toothed on the veins. Transverse anterior line geminate, black, the two parts equally distinct, widely separated on costa, gradually becoming approximate toward inner margin. In course it is irregular, the long inner tooth on submedian vein being best marked. Transverse posterior line unusually near outer margin, leaving a very wide median space, geminate, outer line best defined, narrow, black, inner smoky, included space white, irregularly angulate and dentate, squarely exserted over the reniform, drawn in below, a prominent outward tooth in the submedian interspace. Subterminal line whitish, irregular, incomplete. A series of black terminal spots, forming the tips of sagittate blackish marks which cut the fringes. A blackish irregular bar fills the subterminal space opposite the cell. Median shade black on the costa, oblique through the reniform, becoming smoky, then irregular and close to the transverse posterior line. No obvious claviform. Orbicular round or oval, then annulate with whitish, center concolorous. Reniform large, broad, irregularly kidney-shaped, larger superiorly, ringed with black, filled with smoky or blackish. Secondaries almost white, with a smoky, punctiform, exterior line and a series of smoky terminal lunules. Beneath white, powdery, both wings with a more or less complete, sinuate, outer line and good-sized discal spot.

Expanse, 37 to 41 mm. = 1.48 to 1.64 inches.

Habitat.—Texas.

Two males and one female, the latter greasy and a little defective. The species is altogether different from the other described species, and the black-shaded streak through the submedian interspace of primaries will distinguish it at a glance.

Type.—Cat. No. 4812, U.S.N.M.

57. MAMESTRA SENATORIA, new species.

Ground color very deep purplish brown, overlaid and powdered with black scales, orbicular, reniform and terminal space more or less yellowish, contrasting. Head and thorax without obvious maculation. Primaries with the lines lost in the black powdering, marked on the costa by geminate black spots inclosing a yellowish mark, and by yellowish scales which represent the space included between the geminate lines. Basal line thus marked for its full course. Transverse anterior line apparently upright or nearly so. Transverse posterior line lunulate, apparently of the usual form, fairly evident over the cell. A vague, curved, diffuse, median shade. Subterminal line dull yellow, distinct, continuous, a little irregular, preceded by black blotches in the interspaces; that opposite hind angle being largest and most obvious. Terminal space mottled with yellow scales. Fringes long, feebly scalloped, cut and festooned with dull yellow and with a blackish

interline. Claviform small, concolorous, black ringed. Orbicular rather small, round or nearly so, black ringed, more or less yellow powdered. Reniform narrow, upright, a little constricted centrally, outlined in black, more or less completely yellow filled and contrasting. Secondaries smoky or blackish brown, paler, more yellowish at base, darkest in the female, fringes yellowish, with a brown interline.

Expanse, 31 to 33 mm. = 1.24 to 1.32 inches.

Habitat.—Senator, Arizona, April 24 (female), July 16 (male) (Dr. Barnes).

One pair in only fair condition, the male the larger and best marked, the female so dark and powdery that the contrasts in the male are the more striking. The antennæ in the male have the joints well marked and laterally tufted. The species thus belongs in division A,[1] of the genus, and its broad primaries ally it to *detracta;* but the apices in the new form are well marked, the outer margin is more oblique, and the wing as a whole is more triangular, resembling rather *obscura* and *quadrata.*

The under side is smoky, powdery, with a continuous, black, extramedian line, fringes yellowish, a yellowish discal lunule on primaries and a blackish spot on secondaries.

58. MAMESTRA RAINIERII, new species.

Ground color ash gray with a smoky tinge, head and collar concolorous. Thorax with black tipped scales darkening the disc, patagia with a black submargin. Primaries with all the maculation broken; the upper portion of basal space and the large ordinary spots are whitish gray, and contrast enough to form the most prominent ornamental features. Basal line black, geminate, upright. Transverse anterior line geminate, outer part black, inner smoky, included space whitish gray, broken, outwardly oblique, with small outcurves in the interspaces. Subterminal line geminate, the defining lines obscure, the included whitish space only being traceable across the wing, abruptly bent over the cell and a little incurved below; median space as a whole a little the darkest portion of the wing. Subterminal line made up of white scales, emphasized by a series of black spots in the interspaces, in course only a little irregular. A dusky median shade is marked on the costa. Claviform large, black ringed, powdered with white. Orbicular large, oval, incompletely black ringed, white powdered. Reniform very large, broad, kidney-shaped, outlined in black, white powdered. Secondaries uniformly dull smoky, very powdery. Beneath, uniformly smoky, roughly powdered, secondaries with a prominent black discal spot.

Expanse, 35 mm. = 1.40 inches.

Habitat.—Mount Rainier, Washington (C. V. Piper).

[1] Proc. U. S. Nat. Mus., XIV, 1891, p. 201.

This species, represented by a single, somewhat rubbed male, offers a number of characters that make its removal from *Mamestra* probable when better examples of both sexes are available. As it stands now it belongs next to *gnata*, because the antenna has the joints distinct and laterally with small tufts. The head is retracted though broad, front very flat, palpi small. Thorax quadrate, vestiture loose, divergent. Collar and patagiæ well marked, but dorsal tuftings obscure. Primaries abruptly widened at transverse anterior line, thence nearly parallel to the rounded hind angle, outer margin very oblique, making a long drawn out though rounded apex. The fringes are wanting in the specimen. This wing form is not paralleled elsewhere in the genus; but I have been unable to find any better place for it and prefer not to make a generic type of a defective specimen.

59. MAMESTRA BOLTERI, new species.

Ground color a dull, reddish luteous, shaded with smoky. Head yellow, with a smoky interantennal shade. Collar yellow at tip. Thoracic tuftings yellow tipped, disk of patagia smoky. Primaries without contrasts, the median lines diffuse, smoky and broken, the subterminal line pale and forming the most obvious feature in the maculation. Basal line smoky, marked chiefly by the included space, which is of the ground color and breaks the dusky shading in the upper half of the basal space. Transverse anterior line smoky, geminate, broken, diffuse, a little oblique outwardly and irregular in the interspaces. Transverse posterior line geminate, smoky, diffuse, broken, included space of the ground color, rather abruptly bent below the subcostal over cell and incurved below that point. Subterminal line pale, distinct, relieved and made prominent by continuous dusky shadings on each side, only a little irregular in course. A series of small, black, terminal lunules. Fringes long, yellowish at base, with a diffuse, dusky interline, reddish at tip. Median shade diffuse, darkening the space between the ordinary spots, then rather close to and parallel with the transverse posterior line. Claviform very small, vaguely outlined, relieved by a few yellow scales. Orbicular small, round, a little paler than ground color, and so defined by the contrast with the surrounding shade. Reniform moderate, upright, only a little constricted, outer and upper portion a little yellowish, inner and lower portion smoky. Secondaries uniformly smoky, with a yellowish, somewhat glistening shade, fringes long, yellow at base, more whitish at tip, with an intermediate smoky line. Beneath, primaries smoky, a little paler along costa, where an extra-median line is indicated, and on the fringes. Secondaries more reddish, powdery, with a small discal lunule and a somewhat diffuse, extra median line.

Expanse, 37 mm. = 1.48 inches.

Habitat.—Las Vegas, New Mexico (A. Bolter).

A single female, in excellent condition as to wings, but thorax com-

pressed and vestiture disarranged. This species is unlike any of the species heretofore described and is without close allies. It belongs to the *vindemialis* series on superficial characters, but has a closer resemblance to Agrotid forms like *Noctua pyrophiloides*, the normal markings of the *messoria* group of *Carneades* being combined with the diffuse shadings of the first-mentioned form.

60. MAMESTRA YAKIMA, new species.

Ground color ashen gray, powdery. Head darker, with a more or less obvious dusky interantennal line. Collar with a series of darker scales forming a vague median line. Patagia with a blackish submargin. Primaries with all the markings obscured, tending to but not really strigate, paler rays on veins 3, 4, 6, and 7 cutting into the darker terminal space. Claviform vaguely marked and extending to the middle of the wing. Orbicular round or oval, small or moderate, concolorous, marked by a slightly paler ring. Reniform large, broad, kidney-shaped, but larger inferiorly and there filled with leaden gray which makes it fairly obvious. A series of small black terminal lunules. Secondaries white, with a blackish outer border, which shades into the white well before the middle, veins blackish, fringes white. Beneath white, a little powdery toward the margins, primaries with a dusky discal lunule.

Expanse, 30 to 36 mm. = 1.20 to 1.44 inches.

Habitat.—Yakima, Washington (C. V. Piper).

One male and two females, in only fair condition. On very close examination the maculation seems to be of the *trifolii* type, though so nearly obsolete that this is difficult to recognize; at all events the dentations of the subterminal line refer it to that series. The male antennæ are ciliate and the species is peculiar in having a little pointed frontal protuberance, so small as to be easily overlooked, yet actually existent. This, so far as I am aware, is unique in the genus.

Type.—Cat. No. 4836, U.S.N.M.

61. MAMESTRA DILATATA, new species.

Ground color white, overlaid by smoky, luteous, olivaceous, and black scales, so as to leave the white base visible only in the lines, ordinary spots, and basal space of primaries. Head yellow, with a gray interantennal tuft. Collar white, tipped with smoky, with a broad, black median line. Patagia white, margined with black, the disk mottled with white, black, and olivaceous scales. Primaries with basal space superiorly white, inferiorly gray. Basal line geminate, black, marked on the costa, the inner portion normal, the outer dislocated and forming an oblique blackish mark in the submedian interspace, separating the white and the gray shading. Transverse anterior line geminate, black, included space white, oblique to the submedian interspace, inwardly angulate on vein 1, outcurved below. Transverse posterior

line geminate, black, narrowly lunulate, included space white, its course irregular, outward bend over cell large, so that the line is well removed outwardly and the median space is wide. Subterminal line white, broken, irregular, marked by preceding black spots and following shades, obscured by the white mottling in the subterminal space and the gray apical region. Median shade indicated on the costa, lost in the dark space below until it reappears in the gray shade which extends along the entire inner margin. Fringes whitish, with a series of black lunules at base, and a series of olivaceous lunules at tip. Claviform small, black margined, white centered. Orbicular small, round, black ringed, white centered. Reniform moderate, upright, dilated superiorly, a little constricted in the center, lower half much narrower, black margined, white filled, with a central olivaceous shade. Secondaries smoky brown, a little paler at base, fringes white, a smoky interline extending from the apex half way to the anal angle. Beneath smoky, primaries powdery along the costa, fringes white, marked as on the upper side: secondaries whitish basally, a broad extra median shade line limiting the smoky outer margin; costa powdery, a discal spot smoky.

Expanse, 30 mm. = 1.20 inches.

Habitat.—New Mexico.

One female from the collection of the United States National Museum. This is one of the mottled species not easily describable, resembling *variolata* in general appearance and referable to the *adjuncta* group. It differs in the much darker shadings, in the form and course of the lines, and, most obviously, in the form of the reniform. In fact, on close comparison the resemblances to other species turn out to be casual only.

Type.—Cat. No. 4827, U.S.N.M.

62. MAMESTRA FLORIDA, new species.

Ground color white, powdered with dull luteous and black scales, which gives a very pale gray cast. Head and thorax without markings. Primaries with the maculation rather well written, the large blackish reniform being the most prominent feature, a black costal subterminal blotch, a smaller blotch on the subterminal line opposite the cell, and the dark claviform being the other distinctive features. Basal line geminate, black, included space white, distinct, broken on the median space. Transverse anterior line geminate, black, outwardly angulated in the submedian interspace, and outcurved below vein 1. Transverse posterior line geminate, outer portion even, smoky, inner narrow, linear, denticulate, black, as a whole nearly parallel with the outer margin. Subterminal line white, marked by a preceding dusky shade, irregularly sinuate. A series of blackish terminal lunules. Median shade oblique from costa to reniform, which is completely darkened by it, then vague, diffuse, smoky, parallel with and close to

transverse posterior line. Claviform a small black loop at the angle of the transverse anterior line. Orbicular very small, blackish ringed, white centered, round. Reniform a large black blotch without definite outline. Secondaries white; veins, a punctiform median line, a submarginal indefined band and a narrow terminal line blackish. Beneath white; primaries with a black discal blotch fading out gradually in all directions, and a blackish venular line. Secondaries with a fragmentary dusky submarginal line.

Expanse, 32 mm. = 1.28 inches.

Habitat.—Biscayne Bay, Florida (Mrs. Slosson).

A single male specimen, in good condition. The species is obviously related to *chartaria*, and has the same general type of maculation; but it is much paler, smaller in size, and has white instead of smoky secondaries. There are a number of other minor differences in the maculation, which put the distinctness of this species beyond reasonable question. The genitalia have not been examined.

Type.—Cat. No. 4837, U.S.N.M.

63. MAMESTRA ROSEOSUFFUSA, new species.

Ground color dull whitish, mottled with smoky gray, which in turn is washed with a rosy or pink tinge or shading. Head and collar creamy, palpi brown at the sides. Thorax with a pink tinge over the creamy ground. Abdomen smoky luteous. Primaries with the dark, smoky overlay predominating to the outer portion of median space, then evenly defined against the whitish ground that prevails to the subterminal line, broken only by three dusky clouds in the subterminal space. Terminal space dusky, except at apex. Basal line geminate, outcurved in the interspaces, included space broad, whitish. Transverse anterior line geminate, outwardly oblique, irregularly outcurved in the interspaces, hardly defined, included space broad, whitish mottled. Transverse posterior line narrow, brown, crenulate, single, best marked on the veins. Subterminal line whitish marked by the dusky terminal space, and by three dusky preceding clouds. A series of terminal smoky dots on the veins, fringes with a series of triangular pale spots at base, from which pale lines extend to the tip. Orbicular small, round, very obscure, with a whitish annulus. Reniform not defined, forming a little darker shading. Claviform vaguely marked. A smoky median shade lies just within the dark area of the wing and practically bounds it. Secondaries yellowish, smoky. Beneath very pale, with a yellowish tinge. Primaries with a partial outer line and a smoky subterminal line. Secondaries whitish, creamy and powdery along the costa, with a small discal spot and half a row of extra median spots.

Expanse, 28 mm. = 1.12 inches.

Habitat.—Arizona.

A single good male, which has been in my collection for some years.

It has the wing form of and belongs with *renigera* and its allies. The peculiar rosy shading and the evenly marked contrast between the light and dark shading in the outer portion of median space should distinguish this species.

64. MAMESTRA GRISEATA, new species.

Ground color dark, powdery, ash-gray, without marked contrasts. Head with a smoky interantennal tuft. Collar with a blackish median line. Patagia blackish margined at base of wings. Primaries with a smoky, upright shading through the median space, and a similar shade in outer portion of subterminal and terminal space, leaving the apex free. Basal line geminate, blackish, broken. A small, black, basal streak terminates at the end of this line and the part of the basal space so inclosed is white-powdered. Transverse anterior line well removed from base, consisting only of a gray scale line without darker defining portions; in course slightly and evenly outcurved. Transverse posterior line geminate, smoky, included space gray, somewhat acutely outcurved over the cell and distinctly incurved below. Subterminal line white, slender, irregular, somewhat broader and prominent opposite the anal angle, relieved by the dark shading on both sides of it. A narrow black line at base of fringes which are gray, cut with smoky. Claviform rather short and broad, pointed, black margined, concolorous. Orbicular oval, oblique, moderate in size, outlined by black scales, then annulate with whitish gray, the center concolorous. Reniform outlined and ringed in the same way, rather small, upright, a little drawn in from the outside, but scarcely kidney-shaped. Secondaries smoky, paler at base, fringes whitish. Beneath paler gray, powdery; primaries with an outer band marked in the costal region only; secondaries with extra median smoky band complete, and a dark discal spot.

Expanse, 23 to 30 mm.=0.92 to 1.20 inches.

Habitat.—Hall Valley, Colorado (Dr. Barnes).

One male (the larger) and one female, in fair condition. This species has the antennal joints of the male very distinctly produced, laterally, and furnished with bristle tufts so as to be entitled to the term brush-like. It is therefore allied to *gnata* and should come near to it in the arrangement. In wing form it is like *ricina*.

The most remarkable thing in the specimens before me is the disproportionately small size of the female, which is perhaps not the rule. The ovipositor, it may be noted, is exserted in the specimen under examination. It may be that, with further material at hand, *Ulolonche* will prove a better genus for the species; but it may require an examination of the male genitalia to determine the matter finally.

65. HADENA TAPETA, new species.

Head and collar deep, dark, red brown, the collar tipped with yellow. Patagia red brown with a submarginal line of yellow scales. Thoracic

disk and posterior tuftings luteous yellow. Primaries with a luteous base, overlaid with bright red brown. Basal line single, angulate, black. Transverse anterior line nearly upright, single, black, with a triangular spot on costa and inner margin, else narrow, irregular. Basal space mottled, yellow and brown. Transverse posterior line black, broken, followed by a yellow shade line, outcurved over the reniform. Median space mainly brown, lighter below the submedian, with a smoky blotch on the inner margin. Subterminal line yellow, narrow, with irregular outcurves and inward teeth. Subterminal space brown, the yellow more obvious toward inner margin along transverse posterior line. Terminal space brown, some of the veins marked with yellow. A series of small, black, terminal lunules, beyond which is a series of yellow spots at the base of the fringes. Claviform not traceable in the specimen. Orbicular small, white, punctiform. Reniform creamy, with a brown central line, moderate in size, lunate in form. Secondaries whitish at base, darkening to smoky outwardly, the veins smoky, fringe more yellowish. Beneath whitish, reddish powdered along the costal region. Extra median dusky line and discal dots on both wings, and on primaries the terminal space is paler.

Expanse, 25 mm.=1 inch.

Habitat.—Cocoanut Grove, Florida (E. A. Schwarz).

A single good male from the U. S. National Museum. This is a small, narrow, and blunt winged form like *egens* Walker, or more like the small species of *Mamestra*. The bright, deep rusty brown, which is the predominating shade, is altogether different from any other described species known to me. The tarsi are brown, narrowly ringed with yellow.

Type.—Cat. No. 4822, U.S.N.M.

66. HADENA LUTEOCINEREA, new species

Color a mottling of luteous and cinereous. Front and collar whitish, patagia with black submargin, thoracic disk luteous, posterior tufts gray; abdominal tufts blackish, abdomen pale luteous. Primaries shaded with white along the costal vein and a little powdered in the costal region. Basal line barely indicated on the costa. Transverse anterior line marked by an oblique smoky shade on the costa, and beyond that only by the difference between the yellowish base and smoky median space; its course a rather small, even outcurve. Transverse posterior line geminate on the costa, then outcurved over the cell and deeply incurved below, greatly narrowing the median space in the submedian interspace; defined only by the contrast between smoky median and yellowish subterminal space. Subterminal line yellow, irregularly angulate and sinuate, defined by the dark terminal space and a preceding gray shade which fills the subterminal space at costa and in the middle, leaving two yellowish blotches. A series of small, black terminal lunules. A small black line or streak at base. Orbic-

ular oblique, white. Reniform upright, kidney-shaped, moderate in size, marked by black scales, inwardly annulate with white. Claviform broad, pointed at the tip, extending across the median space, black lined, concolorous. Secondaries whitish, with a narrow smoky margin and a discal lunule. Beneath whitish, powdery, primaries smoky along costal region, secondaries with a discal lunule.

Expanse, 33 mm.=1.32 inches.

Habitat.—Montana.

A single male in fair condition. The species is related to *characta* in wing form and general pattern of maculation, but differs in the yellow shadings and generally paler colorings.

67. HADENA MUSTELINA, new species.

Ground color bluish gray, with brown shadings. Head and collar chocolate brown, patagia edged with brown scales posteriorly. Abdominal vestiture defective. Primaries with the ornamentation obvious along the costal region only. Basal line geminate, inner line deep brown, outer faint. Transverse anterior line geminate, inner line faint, brown, outer black on the costa, then dislocated, broken, and marked only by a few black scales across the wing; as a whole the line is a little outcurved, and outwardly oblique. Transverse posterior line geminate, marked by black spots on the costa, then brownish, obscurely lunulate, widely outcurved and, as a whole, nearly parallel with the outer margin. Subterminal line pale, irregular, preceded by scattered black scales and by a brown costal shade. Terminal space, except apex, a little darker. A brown, crenulated, terminal line. Ordinary spots proportionately very large, concolorous. Orbicular oblique, oval, open above, preceded by a black patch on the median vein, which seems continuous with the black inception of the transverse anterior line. Reniform kidney-shaped, defined by slightly darker scales, except that the narrow space between it and the orbicular is blackish brown. Claviform marked through the basal space by a whitish shade, margined above by black scales, and beyond the transverse anterior line by a margin of black, inferiorly edged by white scales, outline not complete inferiorly; in form it is short and broad. Secondaries smoky, even, fringes white, based by a darker line. Beneath, primaries smoky, with a scarlet tinge along costa and toward apex, an incomplete outer line and a discal lunule. Secondaries whitish, with a vinous red shade along costa and a blackish discal spot.

Expanse, 29 mm.=1.16 inches.

Habitat.—Santa Cruz Mountains, California.

One male, evidently bred, numbered, in red, No. 536, by Mr. A. Koebele. The specimen is evidently a little crippled, but the maculation is perfect and only the vestiture of the abdomen is defective. I cannot say, therefore, just how it is tufted. In a general way the species is allied to the *modica* series, but not closely to anyone in particular.

Type.—Cat. No. 4828, U.S.N.M.

[*Larva.*—Head rounded, scarcely bilobed, clypeus broadly triangular, moderate, paraclypeal pieces narrowly nearly attaining the vertex; brown, reticulate mottled, clypeus whitish, edged below with brown and with three brown specks in its lower part, the central one lowest; tubercles brown, ocelli black, mouth rather pale; width, 3 mm. Body cylindrical, normal, feet equal, tubercle iv of joints 9 and 10 above the center of the spiracle; shields obsolete. Reddish brown, darker dotted, a very broad, sharply-edged, white substigmatal band reaching joint 2 and extending narrowly on anal foot; a narrow greenish white dorsal line on joints 3 to 12. Spiracles small, black rimmed. Feet pale.—*Harrison G. Dyar.*]

68. HADENA JOCASTA, new species.

Ground color, dull fuscous gray. Head and thorax not maculate, patagia obscurely submargined with black. Primaries with the markings well written, median lines connected by a prominent black bar through the submedian interspace; a white shade filling the subterminal space beyond it to the anal angle. Basal line geminate, blackish, marked on costa only. A short black basal streak, reaching less than half way across the basal space. Transverse anterior line geminate, outer portion of line black, inner obscure, intervening space a little whitish powdered, as a whole a little outcurved. Transverse posterior line single, slender, blackish, crenulate and outcurved over the cell, even and incurved below. Subterminal line paler, a little sinuate, preceded by a darker shade; the terminal space also a little darker except at apex. A series of blackish terminal lunules, beyond which the fringes are cut with black. A median shade line is indicated between the ordinary spots and below the transverse bar. Claviform forms part of the bar connecting the median lines. Orbicular large, oblique, oval paler than ground, partly outlined by black scales. Reniform large, concolorous, kidney-shaped, the inner edge black margined, outer not defined. Secondaries even, smoky. Beneath smoky, with a vague outer line on all wings.

Expanse, 30 mm.=1.20 inches.

Habitat.—South Dakota; Chicago, Illinois.

One female in fair condition is before me from South Dakota, and Dr. Strecker has a duplicate from Chicago, Illinois. The species is allied to *diversicolor* in wing form and general habitus.

69. HADENA TELA, new species.

Ground color fuscous brown, overlaid by smoky. Patagia with a darker margin, else head and thorax concolorous. Primaries with the markings fairly evident, not contrasting. Basal line obscurely marked on the costa only. Transverse anterior line geminate, outer line black, inner obscure, included space a little paler, outwardly bent in the interspaces, oblique. Transverse posterior line geminate, widely out-

curved over the cell, almost evenly oblique below, inner line black, slender; outer line brown, indefinite, included space a little paler. Subterminal line pale, broken, a little irregular, preceded by black or brown marks in the interspaces. A series of small, black, terminal lunules. Orbicular round or oval, center concolorous, annulate with paler, narrowly outlined by black scales. Reniform upright, broad, almost oval, the sides a little flattened, large, incompletely outlined and with a paler annulus relieving the concolorous center. Claviform concolorous, outlined in black, extending halfway across median space, a black line from lower margin continuing to the transverse posterior line. There is a black streak along the inner margin near the base, and a black line from the lower part of reniform to the subterminal line. The tendency is to a darkening of the interspaces in terminal and subterminal spaces, taking the form of brown or blackish lines or spots. Secondaries whitish, with a narrow smoky margin in the male; smoky, paler at base, in the female. Beneath, varying from whitish to smoky, more or less powdery, with an incomplete outer line and a discal spot on all wings.

Expanse, 26 to 30 mm.=1.04 to 1.20 inches.

Habitat.—Rio Verde Mountains, Phœnix, Arizona, August and September (Dr. Barnes).

Two males and two females; none of them first class. The species is not really referable to *Hadena*, having an untufted abdomen; but it resembles the *mactata* series in markings and the *leucoscelis* series in wing form, hence I place it here tentatively.

Type.—Cat. No. 4823, U.S.N.M.

70. POLIA EXTINCTA, new species.

Bluish gray over smoky, appearing powdery. Head and thorax irrorate, patagia with a submarginal blackish line. Primaries with the markings fairly evident, not greatly contrasting. Basal line blackish, broken, single. Tranverse anterior line well removed from base, outwardly oblique, moderately outcurved in the interspaces, single, blackish, preceded by whitish gray scales. Transverse posterior line single, blackish evenly outcurved over the cell, thence parallel with the outer margin, denticulate, followed by a narrow pale shading. A series of sagittate blackish marks, in two series of three each, indicates the subterminal line and reduces the subterminal space to a narrow gray band except on costa. A short, thick, black bar crosses this narrow subterminal space, just below vein 2. There is a series of small, black, terminal lunules. Median shade smoky, obscure, oblique from costa to middle of reniform, bent at the lower margin of this spot, thence close to and parallel with transverse posterior line. Claviform concolorous, black margined, of moderate size, extending halfway across median space, pointed at tip. Orbicular oval, black ringed, concolorous. Reniform large, broad, kidney-shaped, inner margin

black, outer defined by pale scales. Secondaries smoky, powdery, with white fringes, a large discal lunule, an extra median line, and a series of terminal lunules, darker. Beneath, powdery, primaries smoky, with an extra median line; secondaries gray, with an extra median line and discal spot.

Expanse, 47 mm.=1.88 inches.

Habitat.—Twin Mountain, New Hampshire, August 3 (Edward W. Cross).

One female in good condition. The species belongs to the series with *aedon* and *pulverulenta*, differing from each in the ground color and details of maculation. I am quite certain that I have seen this species in collections with a name to which it is not entitled. The species of this genus do not seem to be common and of some of them I have seen only the types.

71. POLIA ACERA, new species.

Ground color an even purplish gray with a reddish shading through the median space of primaries. Head with a brown frontal line. Collar more whitish inferiorly to a sharply defined black, transverse line. Patagia well marked, with a vague submarginal darker shading. Primaries with a sharply defined, slender, black streak from base through the submedian interspace, nearly to the transverse anterior line. Another less distinct black streak along inner margin, reaching somewhat nearer to the center of the wing. Basal line not traceable in the specimens before me. Transverse anterior line obsolete or very feebly traceable; geminate, with long outcurves in the submedian interspace and below the submedian vein. Transverse posterior line almost obsolete or imperfectly marked, geminate over the cell, then the inner line narrow, black, dentate on the veins. Subterminal line wanting or indicated by brown interspaceal streaks which are best marked opposite the cell and above the anal angle. Fringes reddish gray. The veins are marked with black scales. There is a brown, median shade line which is incomplete, marked between the ordinary spots and from the tip of the claviform to the inner margin. Claviform black ringed, concolorous, extends halfway across the median space, a slender black or brown streak connecting it with the transverse posterior line. Orbicular oblong, oblique, nearly or quite reaching the reniform, and probably in some instances confluent with it; a little paler than ground, incompletely outlined by black and brown scales. Reniform large, upright, kidney-shaped, somewhat irregular, open above and tending to enlarge, else narrowly outlined by brown scales, a little yellowish centrally. Secondaries smoky yellowish, paler at base, fringes whitish. Beneath, whitish or smoky, a little powdery, without obvious lines or spots.

Expanse, 42 (male) to 52 (female) mm.=1.68 to 2.08 inches.

Habitat.—Pullman, Washington (C. V. Piper); Seattle, Washington.

One pair only, the male in good condition save that it lacks antennæ; the female, which is much older, somewhat defective. The species has the wing form of *theodori*, but differs utterly in maculation from all others of the genus.

Type.—Cat. No. 4826, U.S.N.M

72. POLIA DISPAR, new species.

Ground color very pale luteous gray, almost white. Collar with a faint, smoky line below the tip. Patagia with a submarginal, diffuse, black line. Primaries with smoky powderings which obscure the ordinary maculation. Basal line vaguely indicated by smoky marks on the costa. Transverse anterior line hardly more obvious, but by patching together the scattered black scales, it is seen that the line is strongly angulate in the interspaces, the tooth below the submedian vein almost meeting one from the transverse posterior line. The tooth in the cell takes the form of a black, angulate mark before the orbicular. A short, slender, blackish streak from base to basal line in the cell and a similar, more obscure streak along the inner margin into the tooth of the transverse anterior line. Transverse posterior line somewhat better marked but obscure, incomplete, with long, irregular outward teeth on the veins, and long inward dentations in the interspaces; that in the submedian being best marked. Median shade smoky, somewhat diffuse, oblique from costa between the ordinary spots, then inwardly bent from the lower angle of reniform. It is a little the best marked feature of the wing. Subterminal line concolorous, marked by a series of preceding, sagittate, smoky marks. A series of distinct, black, interspaceal, terminal lunules, beyond which the fringes are cut with smoky. Fringes a little dentate. Orbicular small, round, concolorous, incompletely and very narrowly outlined by black scales. Reniform large, upright, a little kidney-shaped, obscurely annulate with yellowish, a little darkened by the median shade inferiorly. Secondaries in the male white, immaculate; in the female with smoky veins, a smoky terminal line and smoky powderings toward anal angle where an extra median dusky line is well indicated. Beneath white or nearly so with small discal spots, much less obvious in the male.

Expanse, 42 (male) to 45 (female) mm. = 1.68 to 1.80 inches.

Habitat.—Glenwood Springs, Colorado, October 1–10 (Dr. Barnes).

One pair, both fairly good examples. The male has the antennæ serrated and bristle tufted. The primaries are a little broader and more pointed than usual in the genus, and the species is much more obscurely marked. Yet, so far as the maculation is traceable, its dentate character fits well into the series in which I have placed it. The very light color separates it from all save *ochracea*, and from that species, the white secondaries of the male and the totally different ordinary spots will distinguish it.

73. POLIA OCHRACEA, new species.

Ground color a dirty pale gray, with smoky powderings and yellow ocherous shadings. Collar, thoracic disk, and patagia with ocherous shading. Primaries with the ordinary lines all present, smoky, not prominent. Basal line geminate, smoky, broken, the included space broad and whitish on costa. Costal region and cell shaded with blackish before the transverse anterior line, which is unusually well removed from base. Transverse anterior line single, outwardly oblique, smoky, outcurved below median and outwardly toothed below submedian vein. Transverse posterior line single, smoky, irregularly dentate or zigzag, well outcurved over the reniform and well bent inward below, so that the median space is much narrowed. The two lines are connected by a smoky bar in the submedian interspace. Median shade smoky, diffuse, obscure, broken, the median space being so much powdered that the shade line is only locally definable. Subterminal line composed of ocher yellow, somewhat lunate marks preceded by smoky shadings. A narrow, blackish, interrupted terminal line. Fringes a little dentate. Orbicular large, broad, sides outlined in ocher yellow, open above and below. Reniform very large, broad, a little constricted centrally, more so from the outside, sides marked with ocher yellow scales, above and below indefined. Ocher yellow scales are scattered over the wing, but are more obvious in the basal and subterminal spaces. Secondaries whitish, with a smoky tinge, with a blackish extra-median line, a smoky, diffuse, subterminal shading, a blackish, lunulate terminal line and a smoky discal lunule. Beneath with a yellowish tinge; primaries smoky on disk, both with an extra-median dusky band and a dusky lunule.

Expanse, 43 mm. = 1.72 inches.

Habitat.—Iowa.

A single, rather defective male, received years ago from Henry Edwards. The antennæ are serrated and bristle tufted. The species should be recognizable from its ocherous mottlings, which are different from any congeneric form. The wings are rather broad and pointed, as in *dispar*, which this species most resembles.

74. PERIGEA LUCETTA, new species.

Ground color glistening fawn brown, with a tendency to yellow shadings. Head yellow in front, with a narrow black line, a velvety brown interantennal line and a velvety brown neck. Palpi yellow in front, brown at the sides. Collar with a yellowish shade toward base, above margined by a black transverse line. Patagia marked, with a yellowish shade at costal base of primaries. Primaries with the ordinary lines obscure. Basal line marked by scattered yellow and black scales. Transverse anterior line with difficulty traceable, partly geminate, a little outcurved. Transverse posterior line a series of interspaceal blackish lunules; abruptly bent on the costa, else nearly parallel

with the outer margin. It is followed by a broad, vague yellowish shading, merging gradually into the ground. Subterminal line unusually close to outer margin, irregular, consisting of silver gray scales placed in groups. A series of black interspaceal terminal spots, edged with gray scales and fringes cut with gray. Claviform indicated by smoky scales, very small. Orbicular small, broadly oblong, upright, edged by whitish or gray scales. Reniform moderate, outlined by a narrow gray line, with a figure-8 shape, a little paler centrally, almost whitish below. Space between the ordinary spots more blackish and a similar shade obtains beyond the reniform. Secondaries smoky, darker outwardly, glistening, the fringes whitish. Beneath, primaries smoky, reddish powdery along costa, whitish along internal margin, terminal space gray. An extra-median smoky line. Secondaries gray, reddish powdery along the costal region. An extra median brown line, which does not reach the inner margin. Terminal space narrowly gray, margined by a brown band, which almost fills the space to the extra median line on the costa, but narrows toward and barely reaches the internal angle.

Expanse, 41 mm. = 1.64 inches.

Habitat.—Colorado (Barnes).

A single, good male. This is a large form and quite different in appearance from our other species. It has somewhat the shading of *fabrefacta*, but is very differently marked.

75. PERIGEA CERVINA, new species.

Ground color a somewhat glistening, soft fawn brown with scattered black powderings, some of the scales tipped with white. Head and thorax without obvious markings. Primaries without contrasts, all lines obscured. Transverse anterior line marked by obscure blackish shadings, which indicate that it is upright, outwardly angulated in the interspaces. Transverse posterior line marked by a series of small, obscure, blackish venular dots, outcurved over the cell. Subterminal line composed of a series of irregular, interspaceal, blackish marks. A series of rather obvious white dots terminates the veins, and a very obscure series of dusky spots marks the interspaces. Orbicular irregular, oval, concolorous, obscurely and incompletely outlined by blackish scales. Reniform large, broad, incompletely outlined by black scales, among which a few white ones are interspersed: concolorous except for an oblique whitish streak through the lower half. Claviform a small blackish spot below the orbicular in the submedian interspace. Secondaries evenly smoky, a trifle paler at base, fringes more whitish. Beneath gray, powdery, reddish tinted outwardly and along the costal margin, a dusky outer line and a discal mark on all wings.

Expanse, 38 mm. = 1.52 inches.

Habitat.—"Florida;" Mrs. Slosson.

The species resembles *recors* and *albolabes* in wing form and habitus,

and is somewhat like *punctifera* in color, but it is larger than the latter and much more obscurely marked. It may be described from a more southern locality, but I have failed to recognize it. I have only one good female example.

76. PERIGEA TEXANA, new species.

Ground color dirty fuscous brown, more or less black powdered. Head and thorax without definite markings. Primaries with all the normal maculation present; no prominent contrasts. Basal line single, black, followed by a somewhat paler shading, outwardly angulate on the median vein. Transverse anterior line black, single, generally broken, usually preceded by a paler shading, outwardly oblique, broadly toothed. Transverse posterior line single, black, slender, continuous, followed by a paler shade, irregular in course, but almost upright and only a little bent over the cell. Subterminal line pale, broken, preceded by a blackish shading which becomes developed into a large triangular patch opposite the cell and forms the most prominent feature of the wing. Terminal space usually a little darker, as is also the median space, leaving the subterminal space the palest portion of the wing. A series of narrow, dusky terminal lunules, cut by whitish dots on the veins. A narrow, dusky median shade extends from costa obliquely to the lower margin of the reniform, then parallel with the transverse posterior line to the margin; usually only the part below the reniform is obvious, but in some examples it can be traced its full course. Orbicular variable in size and form, from triangular to round, always of the lighter ground color, narrowly outlined in black. Reniform upright, always of good size, somewhat variable, usually wide, a little constricted centrally, lower portion larger than the upper, a few white scales marking the lower angles. The space between these ordinary spots is often darker and sometimes partly black. Claviform a little black loop at the end of an outward angulation of the transverse anterior line. Secondaries smoky, with a yellowish tinge, much paler at the base, fringes yellowish. Beneath pale, powdery, with a discal dot and narrow extra median line black; all well marked in some examples but almost completely absent in others.

Expanse, 27 to 30 mm. = 1.03 to 1.20 inches.

Habitat.—Round Mountain (Schaupp); Shovel Mountain, Texas (Barnes).

Eight males and one female, mostly in good condition. There is little real variation, though no two examples are alike. The ordinary spots differ in size and a little in shape; but the species remains obviously the same. It belongs to the series with rather short wings and stout body, like *loculosa* Grote, and really resembles a reduced *Luperina* rather than normal *Perigea*.

Type.—Cat. No. 4833, U.S.N.M.

77. PERIGEA CONSORS, new species.

Ground color a dull luteo-fuscous, more or less black powdered. Head and thorax immaculate. Primaries with cell before and between the ordinary spots more or less completely black filled. Basal line marked by black scales on the costa and vaguely traceable to the median vein. Transverse anterior line marked on the costa and by black scales which emphasize a difference in shade between basal and median space. In course it is a little oblique, strongly angulate or broadly toothed. Transverse posterior line narrow, blackish, irregular, followed by a paler shading. Subterminal line pale, preceded by a dusky shade which is broader opposite the cell. A broken dusky terminal line, veins pale tipped. A vague, narrow, median shade, marked on the costa and again below the reniform. Orbicular small in the specimens, irregular, tending to open to the costa. Reniform rather large, a little constricted centrally, larger below. Claviform small, outlined by blackish scales. Secondaries whitish, with a yellow tinge at base, with a broad smoky border and a small discal spot. Beneath pale, powdery, with a broken outer line and discal spots.

Expanse, 25 to 27 mm. = 1.00 to 1.08 inches.

Habitat.—Phœnix, Arizona (Dr. Barnes).

Two males and one female, all of them poor and at first sight resembling small, rubbed examples of *P. texana*. They are, however, smaller throughout, and the black-filled cell is a conspicuous difference.

78. CARADRINA LEUCORENA, new species.

Ground color pale luteous, with a reddish tint. Head and thorax immaculate. Primaries with the reniform white marked, a dusky shading along median vein, sometimes to the base, giving a little the appearance of a *Leucania*. Transverse anterior line irregular, geminate, broken, marked only by blackish scales, sometimes scarcely traceable. Transverse posterior line geminate, smoky, with the usual outcurve over the cell, thence rather evenly oblique, or only a little incurved. Outer line composed of small venular dots. Inner line may be continuous, slender, and crenulated, a series of interspaceal lunules, or a series of venular marks. Sometimes the line is scarcely traceable and it is never prominent. Subterminal line is an irregular, vague, paler shading, which may or may not be edged by darker scales. Fringes a little darker, sometimes obscurely cut with smoky, sometimes based by a series of small, blackish, interspaceal lunules, sometimes by white dots terminating the veins. Orbicular a round dot of the darker powdering, surrounded by a ring of the even ground color; but it is always obscure and as often wanting. Reniform upright, narrow, centrally constricted, very obscure, except that the outer edge is partly white and the inferior portion is also white. Secondaries even, dull, pale smoky, with a yellowish tinge, lighter basally. Beneath pale,

creamy gray, with a reddish tinge, with or without an outer smoky line and discal spot on one or both wings.

Expanse, 28 to 38 mm.=1.12 to 1.52 inches.

Habitat.—Los Angeles County, California, in September (U.S.N.M.); southern California (Barnes); Phœnix, Arizona, March 11 (Dr. Griffiths).

Eight specimens, seven of them females, are before me, most of them in good condition. The species is smoothly scaled and has somewhat the appearance of the Eastern *Platysenta videns*, but it is much paler, much larger, broader winged, and with none of the sharp contrasts. Everything is vague, and even the white-marked reniform is not aggressively conspicuous. It has no very close allies in the genus to which I have referred it.

Type.—Cat. No. 4832, U.S.N.M.

79. HOMOHADENA CANDIDA, new species.

Ground color white, more or less overlaid and mixed with smoky and black scales. Head with a broad, black stripe across the front. Collar, with a transverse line of black scales near base, then yellowish, smoky, white and smoky shades in succession. Disk powdered with smoky and blackish scales. Primaries with the ordinary maculation lost or changed to a strigate type. A black streak runs through the middle of the wing from base to outer margin. All the usual lines are indicated by oblique black lines across the costal region. Transverse anterior line marked on inner margin by an oblique blackish streak. Transverse posterior line indicated by black, venular, somewhat elongate dots. The outer portion of the wing is smoky, much darker toward the internal angle, and through this darker shading a paler subterminal line is vaguely traceable. There is a series of short, interspaceal black lines in the terminal region. Fringes very broad, interlined, cut with smoky. Ordinary spots not traceable. Secondaries white, semitransparent; a blackish terminal band, broadest at the apex, narrowing rapidly and lost a little beyond the middle. Beneath white, iridescent, primaries smoky along the costa and forming a broad outer band, secondaries with a smoky apex and a narrow terminal line.

Expanse, 26 mm.=1.04 inches.

Habitat.—Beeville, Texas, May 13 (E. A. Schwarz).

A single female, which may not have its best place as a *Homohadena*. It resembles most nearly *Oncocenmis atricollaris*, but has unarmed foretibiæ. The specimen is in fair condition, but the thorax has been compressed, causing the collar to project hood-like.

Type.—Cat. No. 4814, U.S.N.M.

80. ONCOCNEMIS CILIATA, new species.

Ashen gray, with smoky streaks, shades, and powderings. Head black powdered in front and on the vertex. Collar with a smoky and

a blackish transverse line. Thorax irregularly powdered with gray, smoky and black scales. Primaries streaked with blackish, smoky and white, darkest through the upper half of the median space, with a dusky oblique shade at the apex and another at the internal angle. Median lines lost. Subterminal line indicated by a series of black and gray streaks, disconnected centrally. A broken black terminal line at the base of the very long, even fringes, which are interlined with smoky, and cut with smoky and black. Claviform a long, broken black streak from base to the middle of the wing, margined on both sides with white scales. Orbicular oval, elongate, pointed basally, ringed with white, with smoky center. Reniform small, lunate, ringed with white and with a pale, central powdering. Secondaries smoky, with a vague reddish shading, paler at base. Beneath gray, powdery, with small discal spots, but without lines in the example before me.

Expanse, 22 to 25 mm. = 0.88 to 1.00 inch.

Habitat.—Colorado desert.

Two females, neither of them in good condition, but with the maculation perfectly defined. This is the smallest of the stout species and belongs to the strigate series. I have had it for some years awaiting additional material, but have received none, and conclude that the species is very local.

81. TRICHOPOLIA SERRATA, new species.

Ground color a dull, dark, smoky brown, overlaying a luteous ground. Head and thorax dark brown, with a few luteous scales intermingled. Abdomen dull gray. Primaries with the maculation fairly evident, not contrasting. Basal line pale, the margins marked by scattered black scales, not well defined. Transverse anterior line geminate, nearly upright, included space pale, outer line broken, black, slender, preceding line hardly darker than the ground. Transverse posterior line narrow and black, outer line smoky; in course, outcurved over the reniform and almost touching it, only a little drawn in, below. Subterminal line pale, irregular, broken, without obvious defining shades, the veins a little darker through subterminal and terminal spaces. Below vein 5 a black bar crosses the subterminal space and is continued, less obviously, to the outer margin beyond subterminal line. A series of black terminal lunules. Orbicular large, round or nearly so, of the paler ground color, black ringed. Reniform large, nearly round, of the pale ground color, black ringed. Claviform broad, pointed, extending nearly across the median space; of the darker, overlaying shade, black ringed. Secondaries white, with a narrow, smoky, terminal line. Beneath white, powdery along the costa, primary with a partial outer line; all wings with a blackish discal spot.

Expanse, 25 to 28 mm. = 1.00 to 1.12 inches.

Habitat.—Texas, without definite locality. Two males, of which one is in very good condition. The antennæ are a little serrated, the pro-

jections tipped with bunches of bristly hair, front rugose, but hardly protuberant. We have now three species in this genus, one with pectinated, one with serrated, and one with simple male antennæ.

Type.—Cat. No. 4821, U.S.N.M.

82. LEUCANIA VELUTINA, new species.

Ground color reddish luteous, washed with red brown, especially beyond the middle of primaries. Thorax with a narrow, sharp crest; disk carneous. Palpi reddish gray above, deep velvety brown at the sides. Abdomen washed with carmine red. Primaries with an irregular, diffuse purplish shade along the submedian vein. Basal line vaguely indicated. Transverse anterior line narrow, single, yellowish, a little oblique outwardly to the middle, and then with a small angle a little oblique inwardly. Transverse posterior line forming an acute angle just below the costa, then evenly oblique to the hind margin; narrow, pale, margined on each side by darker red brown. Subterminal line narrow, yellowish, irregular, preceded by a few small, obscure dark spots, the terminal space a little paler than the rest of the wing. Fringes rust red. A vague dusky median shade line is marked below the cell. Orbicular moderate in size, a little irregular, annulate with yellow. Reniform of good size, oblique, oblong, sides outlined in yellow, upper and lower margins obscure. Secondaries semitransparent at base, blackish outwardly, with carmine, interlined fringes and a carmine wash on the disk. Under side of body velvety dark brown. Primaries brown with a carmine wash, with a blackish discal spot and a blackish outer line. Secondaries with a carmine powdering along costal margin, apex, and half of outer margin, with a broken, dusky outer line and a narrow discal spot.

Expanse, 39 mm.=1.56 inches.

Habitat.—Biscayne Bay, Florida (Mrs. Slosson).

The species has the wing form of *unipuncta* and its general build. The markings are all very narrow, thread-like, perfectly distinct, and yet not contrasting. In color and general appearance it is entirely unlike any of our described forms, though like some of the southern species, from which it seems to be also sufficiently distinct.

The type and only specimen is a female, lacking antenna but otherwise in good condition.

83. HIMELLA QUADRISTIGMA, new species.

Ground color fawn gray, varying to reddish or darker according to the amount of dusky powdering. Head and thorax immaculate. Primaries with the ordinary spots black or blackish, contrasting, median lines simple, even, narrow, black, with or without an accompanying pale shade. Basal line simple, broken, blackish, with or without a following paler shade. Transverse anterior line outwardly oblique, a little outcurved, and a trifle drawn in on the subcostal and submedian veins,

with or without a preceding paler shading. Transverse posterior line outcurved over the cell, evenly oblique below, with or without a following paler shade line. A series of black, terminal lunules, followed by a pale line at the base of the fringes. In the darker specimens a paler shade extends from the apex through the subterminal space, making a vague subterminal line by contrasting with the darker terminal region. Orbicular moderate in size, a little irregular, with or without a paler annulus. Reniform oblique, centrally constricted and larger below, with or without a pale annulus. Secondaries whitish, with a yellow tinge and a smoky terminal line. Beneath whitish, powdery, with a broken line and black discal spot on all wings.

Expanse, 27 to 30 mm.=1.08 to 1.20 inches.

Habitat.—Bluff, Utah, May 30 (Mrs. H. M. Peabody); Santa Rita Mountains, Arizona, June 19 (E. A. Schwarz).

One male, three females, all from the U. S. National Museum. Like *contrahens* in type of maculation, but the lines are more even and the contrasting ordinary spots are characteristic. The variation is in the amount of dark overlaying scales which, when most abundant, leave a paler border to all the dark markings.

Type.—Cat. No. 4781, U.S.N.M.

SELICANIS, new genus.

Head small, retracted; front smooth, flat, or with a blunt point. Tongue weak and short. Palpi small, not reaching the middle of the front, terminal joint small. Antennæ of the male with joints marked with small tufts of cilia or single, longer, lateral bristles. Eyes naked. Thorax short, convex, subquadrate, with a small tuft behind the collar and a somewhat indefinite bunch at the base. Abdomen proportionately very long, exceeding the secondaries by one-third to one-half its length; without obvious tuftings. Legs short and stout in the male, clothed with dense bunches of hair and scales; in the female more sparsely clothed, without spinules or other horny armature. Thoracic vestiture consists of long, flattened, scale-like hairs. Wings proportionately short and narrow, with well-marked apices and obliquely arcuate outer margin.

The genus seems to belong with the Orthosiids. Its type is *cinereola*, which is herewith described, and probably the species described as *Anchocelis digitalis* by Grote will also find a place here. *Anchocelis* has a cylindrical frontal protuberance and a spiral, functional tongue, which the new genus does not have.

84. SELICANIS CINEREOLA, new species.

Mouse gray to fawn brown, powdery, scales of thoracic vestiture often white tipped. Head and thorax without markings. Primaries with the median lines whitish, the median space obviously darker than the rest of the wing; narrow, unusually even and like a broad, dark,

central band. Basal line not obvious. Transverse anterior line well removed from base, a little outcurved, even, margined on each side by a narrow smoky line. Transverse posterior line makes a little outward bend below the costa and runs thence evenly and only a little oblique, margined on both sides with a narrow smoky line. Subterminal line, when best marked, whitish, a little diffuse, somewhat irregular, dislocated a short distance from costa, preceded by a smoky shading. From this to entire absence, all intergrades occur. Of the ordinary spots, the reniform is usually traceable by a line of whitish scales, but sometimes all are absent. Secondaries varying from reddish to smoky gray, uniform, or only a little paler at the base. Beneath reddish to smoky gray, powdery, without markings in the examples before me.

Expanse, 30 to 40 mm. = 1.20 to 1.60 inches.

Habitat.—Denver, Colorado, October 12 (Oslar); Glenwood Springs, Colorado, October (Dr. Barnes).

Three males and three females in fair condition. The species somewhat resembles an exaggerated *Telesilla*, or a narrow-winged *Plagiomimicus;* but the structural characters are, of course, distinctive. The variation is in size, in ground color, and in the degree of development of the subterminal line; and yet withal the species holds its characteristic appearance.

Type.—Cat. No. 4831, U.S.N.M.

ANEPISCHETOS, new genus.

Head moderate in size, hardly prominent. Eyes naked, large, hemispherical, prominent. Tongue normal. Palpi very long, exceeding the front by nearly the length of the thorax, transversely flattened, vestiture scaly and directed toward both edges, middle joint much the longest, projecting straight forward or a little oblique, terminal joint less than one-half as long as the second, clothed in the same way, directed obliquely upward. Front with a long pointed tuft, extending forward over the base of the palpi. Antennæ of the male with long lateral bristles. Thorax and abdomen untufted, the former with smooth, scaly vestiture. Legs rather long, closely scaled, unarmed except for the usual spurs on the tibiæ. Primaries triangular, short, broad, with acute apex and arcuate, oblique, outer border.

At first sight this seems a Deltoid genus, but the venation of the secondaries is strictly 3-fid, though vein 5 is fairly developed. The palpi have the scales projecting beyond the edges both above and below, forming a two-edged member and thus differing in a second essential. We have no previously described genera with which this might be best allied, and, pending further discoveries, this might be associated with *Doryodes*, etc.

85. ANEPISCHETOS BIPARTITA, new species.

Ground color a pale, luteous brown. Head and thorax with an admixture of gray. Primaries with an even, oblique white line, start-

ing from the costa about three-fourths from base and ending at about the middle of the inner margin. Within this, the wing is uniform, yellow brown. Beyond the white line is a pale shade which merges gradually into an obscure dusky or smoky shading. A subterminal line of brown spots is traceable through this shading, in most specimens. The orbicular is indicated by a black dot. There is a brown line at the base of the fringes. Secondaries, uniform smoky brown. Beneath, smoky, immaculate.

Expanse, 17 to 19 mm.=0.68 to 0.76 inch.

Habitat.—Key West, Florida.

Four males are before me and I have seen others. The species seems to be not uncommon, and may have been described as a Deltoid, which it resembles as well in the simple maculation as in the wing form and abnormally developed palpi.

Type.—Cat. No. 4815, U.S.N.M.

DIALLAGMA, new genus.

Head moderate in size, front broad, little convex, not tufted. Antennæ in the male well ciliated, with longer, bristle-like hair on each side of each joint; in the female simple. Tongue normal. Eyes naked, moderate in size, not prominent. Palpi disproportionately stout and long, straight or somewhat oblique, exceeding the head by its own length; second joint longest, a little arcuate above, clothed with scales directed downward and longer at the tip, so that this is very broad when viewed from the side. As the joint is also thickened laterally, the palpi diverge and do not form a snout. Terminal joint short, stout, subequal, straight or a little oblique upwardly. Thorax small, convex, vestiture scaly, close, forming no tufts. Abdomen well exceeding anal angle of secondaries, untufted. Legs unarmed except for the usual spurs, which are long and stout, vestiture scaly and, though close, quite thick, so that the tibiæ especially seem heavy. Primaries rather long, moderate in width, widening rather evenly from base, apex rectangular, outer margin even, fringes long. Venation normal. Secondaries proportionate. Vein 5 well marked though weaker than the others, from the cross vein rather close to 4, but not forming a branch of the median.

As a whole the moths are somewhat slender and narrow-winged closely scaled, and most marked by the heavy palpi. The genus seems best related to the Eucalypterid series at present.

86. DIALLAGMA LUTEA, new species.

Ground color clay yellow, smooth, with rough black powderings from which the markings are formed. Head a little more yellow on the vertex, palpi chocolate brown at the sides, collar and disk of thorax irrorate with brown; but not otherwise ornamented. Primaries with all the lines blackish and more or less broken, a large quadrate blackish patch in the middle of the wing, just beyond the transverse anterior

line, forming the most prominent feature. Basal line forming triangular blackish brown costal spot. Transverse anterior line upright or nearly so, blackish, broken, diffuse. Transverse posterior line blackish, broken, single, abruptly and somewhat squarely exserted over the cell, followed by a slightly paler shade. Subterminal space darkening to a blackish shade, which marks the subterminal line by the contrast with the paler terminal space; this line only a little irregular. The terminal space itself becomes somewhat darker to the margin, on which is a series of black, interspaceal dots, the fringes marked by dusky cloudings opposite the veins. Orbicular a distinct, round, black dot. Reniform very obscure, and indicated only by a variable number of black scales. Secondaries smoky, immaculate. Beneath variable; primaries blackish, with a pale subterminal shading, and this varies to an almost even, smoky gray; secondaries whitish, with a discal spot, a median, an extra-median, and a terminal band smoky brown or blackish, the fringes cut with dirty white and smoky.

Expanse, 19 to 21 mm.=0.76 to 0.84 inch.

Habitat.—Charlotte Harbor (Mrs. Slosson); Archer, Florida, July 3 (Koebele); September (U.S.N.M.).

Several specimens, representing both sexes, are before me, and I have seen others. The species seems to be rather common in some portions of Florida, and is not subject to variation except in the relative distinctness of the black markings. The quadrate dusky patch in the middle of the basal third of the primary is characteristic.

Type.—Cat. No. 4834, U.S.N.M.

HELIODES Guenée.

Thus far no representatives of this genus have been described from our fauna; but I have now before me two species that seem to fit perfectly to Lederer's characterization. The moths are small, plump, with fine, loose vestiture, and short, trigonate primaries. Head with a protuberant, bulging front, with a naval-shaped depression in which is a short pointed process. Palpi reaching this process, the terminal joint a little oblique, with rough, hairy vestiture. Eyes narrow, small, naked. Tongue normal. Antennæ in both sexes simple. Tibiæ without spinulation or other armature, save the usual spurs; legs short, stout, with heavy clothing of scales and hair, not tufted. In habitus the species resemble *Melicleptria*.

87. HELIODES ANGELICA, new species.

Ground color of head and thorax black, the fluffy vestiture yellowish and sometimes with a carmine shading. Abdomen black, terminal segment yellow. Primaries with a blackish ground, over which there is a more or less obvious carmine shading, sometimes making the wing absolutely carmine and sometimes leaving it almost black. An oblique yellow band, made up of two contiguous spots, crosses the primaries

beyond the middle. These spots are usually joined, but they may be entirely separated and even reduced to small dots. In some specimens a yellowish subterminal line is traceable, and in one example it is complete; in another there is no sign of it. There may be a yellow or gray shading on the costa in the basal space, and there is usually one on the costa just before the apex. Secondaries black, fringes yellowish, with two oblong, yellow spots, which may be united so as to form an incomplete median band, may be reduced to mere dots, or may be entirely absent. Beneath black, the spots of the upper side reproduced in white.

Expanse, 14 to 16 mm. = 0.56 to 0.64 inch.

Habitat.—Los Angeles County, California, in May.

Three males and three females, all from the U. S. National Museum collection. The line of variation has been indicated in the description, and it is not improbable the altogether immaculate examples may occur.

Type.—Cat. No. 4818, U.S.N.M.

88. HELIODES RESTRICTALIS, new species.

Ground color of head and thorax black, more or less overlaid by white or yellow scales and by yellow fluffy hair. Abdomen with a carmine tinge, which is most obvious laterally, terminal segment yellowish brown. Primaries black, overlaid by carmine, with a tendency to a covering of whitish scales in the basal space. Median space yellowish or whitish, broken by the large reniform, which is of the ground color. Fringes blackish, smoky. Secondaries black, immaculate in one example, with a white spot, a little above the middle, in the other. Beneath black, primaries with two, secondaries with one white spot.

Expanse, 13 to 14 mm. = 0.52 to 0.56 inch.

Habitat.—Butte County, California (Coquillett).

One male and one female, in fair condition only, from the U. S. National Museum. It is impossible to say just what is the range of variation in this species, but it does not tend in the direction of *angelica*. It will probably tend to a broader, pale median space, in which the reniform may be completely surrounded. The body beneath is brightly clothed with yellow on the breast, while the venter is carmine except at the base.

Type.—Cat. No. 4817, U.S.N.M.

NARTHECOPHORA, new genus.

Eyes naked, hemispherical, large, somewhat prominent. Antennæ in both sexes simple, feebly ciliated. Tongue weak and soft, but of moderate length. Palpi very small, drooping, almost aborted. Head with clypeus turned up to form a projecting rim, front produced into an oblique plate, the lateral corners of which are drawn out into points; the vertex continued forward into a keel, surmounting the frontal plate and projecting in a point some distance beyond it. Seen when the vesti-

ture is complete, it seems like three corneous points, the central longer and a little above the others. Thorax rather small, oval, convex, the vestiture thin, mostly hairy, forming no definite tuftings. Abdomen conic, well exceeding the anal angle of secondaries, smoothly scaled. Legs moderate in length, proportionate, smoothly scaled, tibiæ not spinulated, anterior with a slender curved claw at tip. Wings moderate, seeming rather frail, because their peculiar maculation gives them a thinly scaled appearance. Primaries long, the costa scarcely convex, apex somewhat drawn out, outer margin oblique and arcuate. Secondaries proportionate, vein 5 a very strong fold, almost midway between 4 and 6.

The genus resembles *Acopa* in habitus and general appearance, and belongs with it. In frontal structure it resembles *Tristyla;* but the vestiture is not scaly and the tibial armature and weak tongue will separate it.

89. NARTHECOPHORA PULVEREA, new species.

Ground color a somewhat reddish luteous, evenly powdered with blackish scales, so separated that the ground color showing through, makes the wing seem semitransparent. Head and thorax immaculate. Primaries with a broad, somewhat diffuse band, even or toothed at the middle, representing the transverse anterior line. A similar, more diffuse, narrower, bisinuate band represents the transverse posterior line. Reniform a white crescent at the end of the discal cell. Secondaries, more whitish, somewhat silky, immaculate, a little more dusky outwardly. Beneath, silky reddish-gray, immaculate, save that on the primaries the white reniform shows through from the upper side.

Expanse, 21 to 23 mm. = 0.84 to 0.92 inch.

Habitat.—Tucson, Arizona, July 19, 20, 21.

Two males and two females, very much alike, save that the females are a trifle darker and better marked. The species is so simply ornamented that it should be easily recognizable, even aside from the strong generic characters. The examples were taken by Mr. E. A. Schwarz, and are from the collection of the United States National Museum.

Type.—Cat. No. 4783, U.S.N.M.

PALADA, new genus.

Head small, closely applied to thorax, though hardly sunken. Front rough and protuberant, clothed with short, stiff vestiture. Tongue normal. Eyes naked, reniform. Palpi reaching to the middle of front, second joint densely clothed, terminal joint short, oblique, obtuse. Thorax plump, with a layer of close scales, over which is a fluffy, thin, hairy vestiture. Abdomen conic, reaching to the anal angle of the hind wings. Legs short, stout, clothed with scales and long hair, tibiæ not spinulated, anterior short and broad; at the tip the inner angle is prolonged into a horny, claw-like process; the outer into a short, blunt

spur. Wings short and stiff; primaries with the costal margin sinuate, distinctly depressed at its middle, apex acute, drawn out, outer margin evenly oblique, fringes long, margins even; secondaries, rounded, proportionate.

This little genus of Heliothids is allied to *Melicleptria*, from which it differs by the lack of tibial spinules. The short, broad fore-tibia, the protuberant rough front, and the sinuate costa of the primaries form a combination that separates it from the other allied forms.

90. PALADA SCARLETINA, new species.

Head and thorax black, clothed with fluffy light-yellowish hair that gives a hoary effect on a good specimen. Abdomen black, terminal segment luteous. Primaries with basal and subterminal spaces tawny to deep smoky brown, median and terminal spaces luteous, the latter very narrow, the former superiorly shaded with tawny or smoky. The lines are marked by the contrasts in the shading of the spaces. Transverse anterior outcurved, the edges a little irregular; transverse posterior evenly bisinuate; subterminal irregular and very close to outer margin. Fringes purplish to smoky. Reniform vaguely indicated by a somewhat darker shade. Secondaries, evenly black. Beneath, primaries scarlet, verging to purple, black at base, yellow at the apex; secondaries black, with a brown tinge. Breast yellowish, venter red brown, the apex yellow.

Expanse, 17 to 20 mm. = 0.68 to 0.80 inch.

Habitat.—California; San Diego County, California; Utah.

Two males and one female, only the latter in really good condition; the examples received at long intervals. The two males are the smaller and darker, one of them having been in my old collection twelve years ago. The species is so strongly marked that it does not seem possible to mistake it.

Type.—Cat. No. 4816, U.S.N.M.

91. SCHINIA RENIFORMIS, new species.

Head and thorax white, vestiture hairy over a scaly base. Primaries white at base, merging gradually into a broad transverse anterior band of a greenish-gray color, which forms an outward acute angle below the median vein. Median space white. Subterminal space greenish gray or olivaceous, the margins even, broadest on costa, outwardly curved over the cell and then very even to the inner margin. Subterminal line broad, white, very even. Terminal space greenish gray, even. Fringes white, cut at the tips with greenish gray. Reniform large, greenish gray, oblique, centrally constricted. Secondaries white, with a variably wide smoky outer band, through which there may be a white shade line. Sometimes there is a smoky discal spot. Beneath, with the maculation of the upper side reproduced except for the basal band of the primaries.

Expanse, 20 to 25 mm. = 0.80 to 1.00 inch.

Habitat.—Colorado (Bruce); Denver, June 20 (Oslar).

Six specimens, evenly divided as to sex, and I have seen others. The species is allied to *cumatilis* in appearance and has been confused with it; but it is obviously distinct by the large, prominent reniform and the very even margins of all the maculation. The gray color has the appearance of being veiled by a faint wash of white.

Type.—Cat. No. 4824, U.S.N.M.

92. SCHINIA OCULATA, new species.

Head and collar yellowish, the latter with brown powderings. Disk of thorax white, with yellow mottlings. Primaries at base creamy, with ocherous mottlings. The broad median space silvery white, without band, but with a large kidney-shaped reniform, which is ocherous and emphasized with black scales. Subterminal and terminal spaces creamy, the subterminal a trifle more gray, at and below the apex a brownish patch. A series of small, brown, terminal lunules, becoming lost toward the hinder angle. Costa over the reniform, creamy. Secondaries with a yellowish tint, with a broad, smoky, outer margin. Beneath, primaries with the disk blackish, inner and costal margins yellowish, a yellowish subterminal line, and a large blackish discal spot. Secondaries white with a yellow tinge.

Expanse, 23 mm. = 0.92 inch.

Habitat.—Rio Verde Mountains, Phœnix, Arizona, August, Dr. Barnes.

One defective male and one good female. Differs obviously and at once from the other silvered species by the absence of a median band.

93. SCHINIA CILIATA, new species.

Head yellow in front. Vertex and thorax a mixture of creamy and rusty brown scales, vestiture somewhat loose. Primaries ocherous, mixed with deep rust brown at base. Then silvery white to a broad median band which is similarly ocherous and brown, outwardly a little bent on the cell, and separated by a narrow silver line from a broadly oval, brown reniform. Beyond this band and reniform spot the wing is again silvery to the powdery, rusty brown, broken, subterminal line, beyond which it is creamy white. There is a rusty brown spot on the margin below the apex, and a series of brown terminal marks extends halfway to the hind angle. Secondaries white, with a narrow, slightly dusky outer margin. Beneath, primaries blackish, except along inner margin and at apex. Secondaries white, with a blackish spot at the inner third of outer margin.

Expanse, 22 mm. = 1 inch.

Habitat.—Hot Springs, New Mexico, 7,000 feet altitude, August. Collection of George D. Hulst.

One female in excellent condition. This specimen has been in my hands nearly ten years awaiting a mate. As none has arrived, it may

be fairly considered as rather rare or at least local. It has a median band like *conchula*, but has also a separate reniform and evident subterminal line.

We have now four species referred to *Schinia* which are largely silvered on the primaries and would be classed as *Tricopis* if Grote's generic term could be used. These are *conchula* Felder and Rogenhofer (*chrysellus* Grote), *aleucis* Harvey, *oculata* Smith, and *ciliata* Smith. The two former are narrower winged and the primaries are more pointed than in the latter. In *conchula* there is no reniform and the median band is angulated so as to include the space that should be occupied by it. In *ciliata* there is a similar band, but outside of, and separated from it, is a large reniform. In *aleucis* the median band is upright, the reniform is entirely separated, the terminal and part of the subterminal spaces are dusky, and there is a triangular, silver, anteapical spot on the costa. Finally, the reniform is very large and prominently contrasting. No effort has been made to ascertain what differences there may be in tibial armature. The fact that the term *chrysellus* Grote must yield to *conchula* Felder and Rogenhofer has been recently pointed out by Mr. Strecker.

TRIPUDIA LUDA Druce.

Agrophila luda DRUCE, Biol. Cent.-Amer., Heterocera, II, 1898, p. 491, pl. XCIV, fig. 25.

Five specimens of this species are before me; two of them from Sonora, Mexico, 40 miles from the Arizona line; two marked "Ariz.," without other information, and one, taken by Mr. E. A. Schwarz, marked Tucson, Arizona, May 18, 1898. It seems probable that this will prove not uncommon on both sides of the border.

The original reference to *Agriphila* can hardly be sustained if Lederer's limitation of the genus is correct. The genera of this series need further study; but for the present I prefer to change the reference originally made by Mr. Druce to *Tripudia*, because the species seems congeneric with our species, and because I have two others which I prefer to describe under that head.

94. TRIPUDIA BALTEATA, new species.

Head and thorax ashen gray, the disk and posterior tuft of scales a little darker. Abdomen with rather a prominent dark scale tuft on the third segment, yellowish at base. Primaries ash gray at base, followed by a broad, oblique, bright luteous band which extends to the middle of the wing. This is followed by ashen gray, with a brownish overlay to the paler gray fringes. The outer edge of the yellow band is margined by a black line which, on the cell, forms an outward loop to include the reniform shading and merges with the transverse posterior line. The latter is single, black, and below its merger with the line previously described is irregularly angulate. The subterminal space is shaded with brown, the subterminal line being indicated by pale, rather

pinkish shadings which are irregular and disconnected. The terminal space is gray, with a broken black line at the base of the gray and brown mottled fringes. Secondaries smoky brown, paler at base. Beneath pale reddish luteous, secondaries more whitish, both powdery and darker shaded along the costal margin.

Expanse, 14 to 15 mm. = 0.56 to 0.60 inch.

Habitat.—Santa Rita Mountains, Arizona, May 29 and June 16, Mr. E. A. Schwarz.

Two females in good condition. The species is very characteristic and should be recognizable. It resembles the *T. flavofasciata* of Grote.

Type.—Cat. No. 4780, U.S.N.M.

95. TRIPUDIA LUXURIOSA, new species.

Head and thorax silver gray, with darker, reddish brown scales intermixed, disk and posterior bunch of scales on thorax, brown; abdomen gray with yellow tinge. Primaries silver gray at base to the transverse anterior line, which is single, brown, broken and irregular, the basal line being traceable over the costal region by pinkish scales. From the transverse anterior line to the inner edge of the brown median shade the space is whitish, shaded with pink, basally. The median band is brown, edged with black scales, twice dentate on each side, the teeth being opposite, so that we have two constrictions and three expansions. Silvery scales edge this band outwardly and lighter scales extend to the deeply sinuate transverse posterior line, which is brown, incomplete, and single. Subterminal line silvery white or creamy, irregular, with two square insets, which are silvery, and three blocks of blackish scales above, between and below these insets. Apex brick red, rest of terminal space reddish brown. The long fringes are irregularly mottled and marbled with black, gray, and brown. Orbicular barely indicated by dusky scales before a constriction of the median band; the reniform better marked by an indefined dusky spot beyond it. Secondaries smoky brown, the fringes more gray. Beneath yellowish, mottled with black.

Expanse, 11 to 13 mm. = 0.44 to 0.52 inch.

Habitat.—Arizona; Santa Rita Mountains, Arizona, June 14, 1898 (E. A. Schwarz).

Two females; one of them, taken by Mr. Schwarz, very fresh, the other, an old example, a little faded and without definite locality. The description is from the fresh example, which is really very handsome and richly colored. This species should also extend into Mexico, but has not been recognized as described.

Type.—Cat. No. 4779, U.S.N.M.

THALPOCHARES DARIA Druce.

Thalpochares daria DRUCE, Biol. Cent.-Amer., Heterocera, II, 1898, p. 497, pl. XCV, fig. 29.

This seems to be rather a common species in the southwestern United States. I have it from several points in Texas, from as many collectors;

from Hot Springs, New Mexico, 7,000 feet altitude (Hulst collection); Oracle, Arizona, July 7 (E. A. Schwarz), and some point in Southern California, from Dr. H. H. Behr. The type locality is Jalapa, Mexico. The specimens vary somewhat in the amount of contrast and in the ground color; but in general they are lighter or darker ashen gray, the reniform creamy or whitish, the light shade extending to the costa and forming a triangular contrasting blotch which will call attention to the species.

The generic reference is questionable if our own species of *Thalpochares* are correctly referred.

PARORA, new genus.

Head rather small, well applied to the head, though hardly retracted. Eyes naked, hemispherical, not prominent. Palpi long, obliquely projecting beyond the head by more than its own length; second joint longest and evenly thickened; third slender, cylindrical, rounded at the tip. Front only a little convex, with a short, pointed, hairy tuft. Tongue strong, normally developed. Thorax rather short, quadrate, only a little convex, with close scaly vestiture. All the tibiæ unarmed, except for the usual spurs. Abdomen cylindric, smoothly scaled, a little exceeding the anal angle. Primaries broad, costa and inner margin arched, apex rectangular, the outer margin a trifle excavated below it and a little produced at the middle. Secondaries proportionate, vein 5 as strong as any other, but from the cross vein and well removed from 4, not really forming part of the median series.

The genus at first sight tends to the Erebiid or Poaphilid series, but the moderate discal cell and the location of vein 5 of the secondaries indicates its place to be a little higher in the series.

96. PARORA TEXANA, new species.

Ground color a very pale luteous. Head and collar chocolate brown, thorax with a somewhat paler brown discal stripe, which may become partly lost. Primaries without strong contrasts, the most prominent mark being a smoky cloud which extends from the reniform to the transverse posterior line or a little beyond it. Transverse anterior line narrow, brown, upright or a little oblique, with three almost even sinuations. Median shade line a little broader, but more diffuse at the edges, darker, parallel with the transverse anterior line and a little within the middle of the wing. Transverse posterior line slender, blackish, followed by a paler shade, defined outwardly by a few dark scales, so that the line seems geminate. In course it is broadly outcurved over the cell, and only a little drawn in, in the submedian interspace. Subterminal line lunulate, slender, dark, preceded by a pale yellow line at the base of the fringes. Orbicular a small blackish dot. Reniform moderate in size, upright, a little constricted in the middle, yellow. Secondaries smoky with a reddish shading, a little paler at base. Beneath more yellow, practically immaculate.

Expanse, 26 to 27 mm.=1.48 to 1.52 inches.

Habitat.—Brownsville, Texas, June 11 (Townsend); San Diego, Texas, June 12 (Schwarz); Corpus Christi, Texas (Dr. Barnes).

Three females, two of them from the U. S. National Museum. None of the examples are perfect, but on all of them the characters are well recognizable. The markings are not well written and the only notable feature is the dark shading of the primaries just beyond the reniform, which in one example extends almost to the apex.

Type.—Cat. No. 4777, U.S.N.M.

97. SYNEDOIDA SUBTERMINA, new species.

Ground color pale luteous, varying to grayish. Head and thorax immaculate. Palpi with second joint black at base. Antenna with a rosy flush outwardly. Primaries with costa a little reddish, vestiture smooth and even. Basal line single, black, broken on the cell, contrasting. Transverse anterior line marked by a black or blackish costal spot, and beyond that reduced to scattered black powderings. Transverse anterior line geminate on the costa, smoky, traceable as a very narrow thread over the cell and then lost. Subterminal line distinct, broad, yellow, a little sinuate, marked by preceding black points and scales. A dusky oblique shade from vein 6 to the apex. A series of more or less obvious terminal dots on the veins. Orbicular wanting. Reniform blackish, upright, narrow, inner margin straight, outer a little incurved, forming the most prominent feature of the wing. Secondaries whitish at base, darkening to a blackish outer border, the fringes smoky. Beneath pale, reddish powdery, all wings with a discal spot.

Expanse, 35 to 37 mm.=1.40 to 1.48 inches.

Habitat.—San Diego County, California.

Two females in good condition, one of them with a grayish bloom over the luteous ground. The species somewhat resembles *Tæniocampa* at first sight, and is most nearly allied to the *Tæniocampa vegeta* of Morrison, which is the *Cissusa spadix* of Cramer. The obvious subterminal line, contrasting reniform, and otherwise lost maculation will serve to distinguish this species.

Type.—Cat. No. 4830, U.S.N.M.

ANTIBLEMMA Hübner.

Two species referred to this genus are in our lists: *inexacta* Walker= *canalis* Grote, which ranges from New York into the West Indies, and *guttula* Henry Edwards, so far only recorded from Georgia. The two species are similar, *guttula* having a very large bluish reniform which gives it at first glance a strikingly different appearance from *inexacta;* yet the resemblance in other directions is close. Among the specimens that I have been placing with *inexacta*, I find a series of four examples, male and female, which are uniformly smaller, much darker in ground

color, and with the primaries much less excavated below the apex. These I am unable to identify with any other described form and have named *minorata*. All are from Florida. Another specimen, from Arizona, is yet different, the ground color becoming bluish gray, while a darkening of the space between the median shade and the transverse posterior line forms a broad smoky band which crosses both wings; this I have called *fasciata*. The secondary sexual characters are the same in each instance so far as appears by a superficial examination.

98. ANTIBLEMMA MINORATA, new species.

Ground color a somewhat dull fawn brown, more or less black powdered. Head and collar chocolate brown or darker, thorax and abdomen concolorous. Primaries sometimes quite even, sometimes strongly powdered, the maculation variably evident. Transverse anterior line slender, blackish, inwardly oblique, outcurved in the interspaces, rarely complete. Transverse posterior line rusty yellow, preceded and sometimes followed by a blackish line or shade, with a long, acute angle between veins 6 and 7, inwardly oblique and a little incurved to the inner margin, one-third from the inner angle. Subterminal line a series of more or less diffuse, interspaceal spots in a bisinuate course; sometimes connected by a dusky shade which may fill the space between transverse posterior and subterminal lines to the angle in the former. The shade may then be continued from this angle to the apex, making an apparently straight line from apex to the hind margin. Median shade blackish, diffuse, a little irregular, angulated on the cell, more or less broken. Orbicular a small black dot, more or less completely margined by white scales. Reniform moderate in size, irregular, sometimes scarcely defined, sometimes black and contrasting. Secondaries with a median line which is a continuation of the transverse posterior line of the primaries. The median shade of primaries crosses the secondaries at basal third and is broken or obscure; in one case only an elongate spot near the inner margin. Subterminal line similar to that of primaries and as variable, but a little farther from the margin. Here also the subterminal space is sometimes dark filled, so as to form a broad band. There is a small, black, discal dot. Beneath paler, more irrorate and powdery, with a scalloped, irregular, outer line, a black dot representing the orbicular, and discal spots on both wings, and a white, linear spot representing the reniform on primaries.

Expanse, 28 to 29 mm.=1.12 to 1.16 inches.

Habitat.—Florida, April and June 13 (Hulst); Glenwood, Florida (Barnes).

Two males and two females; none of them in good condition and no two alike. In one case the powdering is almost wanting and the reniform is contrasting. In another the maculation is almost all wanting; a third has the subterminal space on both wings dark filled, while the fourth has this shading broken into spots.

Type.—Cat. No. 4838, U.S.N.M.

99. ANTIBLEMMA FASCIATA, new species.

Ground color, mouse gray with a bluish tinge. Head and collar defective in the specimen before me, but apparently not red brown. Thorax and abdomen concolorous. Transverse anterior line red brown, slender, single, very evenly zigzaged, inwardly oblique. Transverse posterior line very narrowly yellow, margined on each side with chocolate brown for its entire course, which is as in *minorata*. Median shade broad, blackish, a little diffuse, as a whole parallel with the transverse posterior line, the intervening space between the two brown filled; lightly so on costa, densely so toward the inner margin. A brown shade extends from the angle of the transverse posterior line to the apex. Subterminal line an irregular series of interspaceal blackish marks, varying in size and shape, forming a dusky shading opposite the anal angle and another opposite the cell. Orbicular a blackish dot. Reniform obscured in the median shade band. Secondaries with the transverse posterior line of primaries continued across at the middle, the median shade crossing at one-third from base, the interval brown filled and with a central discal black dot. Subterminal line crossing as an irregular, dark, broken, diffuse shade, best marked just above the anal angle. Beneath, reddish gray, powdery, disk of primaries darker, more powdery, with a white discal spot on all wings.

Expanse, 29 mm.=1.16 inches.

Habitat.—Arizona; Hulst collection.

The type, belonging to the Rutgers College collection, is a male in rather poor condition, but so obviously distinct that description seems warranted.

100. BOMOLOCHA VEGA, new species.

Ground color smoky brown, powdery. Head and thorax unicolored darker brown. Palpi oblique, a little curved in all my specimens. Abdomen pale, smoky. Primaries as a whole darker to the median shade, thence with a somewhat more luteous, paler shade; interrupted in some examples by a darker subterminal shade. Transverse anterior line upright, irregular, broad, diffuse, only a little darker, preceded by a paler shade. Transverse posterior line irregular, indistinct, smoky, outcurved over the cell, with a small inward sinuation below. Median shade somewhat irregularly sinuate, best marked by the difference in color between it and the paler following shade. Subterminal line very irregular, toothed, angulated and sinuate, black, broken, preceded by black scale shadings varying in extent, but never great. A series of pale, terminal, interspaceal somewhat lunate spots. Fringes with a pale interline, beyond which they are cut with light and darker shades. Orbicular small, round, dusky, not defined and hardly contrasting. Reniform is an indefined, pale oval, at the end of the cell. Secondaries even, smoky. Beneath, even, rather pale smoky, all wings with a discal spot.

Expanse, 30 to 33 mm.=1.20 to 1.32 inches.

Habitat.—Las Vegas, New Mexico (Bolter); Lower California (Barnes).

Four males in good or fair condition and much alike, save for the difference in the amount of contrast between the shadings. The species belongs to the series with complete median lines, but has no close allies in the described forms.

Type.—Cat. No. 4820, U.S.N.M.

A NEW BIRD OF PARADISE.

By ROLLA P. CURRIE, B. A.

In looking over the Museum series of Paradiseidæ, Mr. J. H. Fleming, of Toronto, who has made a study of this family, noticed a specimen of *Cicinnurus* which, as he pointed out, differs from the King Bird of Paradise, *Cicinnurus regius* (Linnæus), in several important particulars. Through the kindness of Mr. Robert Ridgway, Curator of the Division of Birds, I am enabled to present a description of this beautiful species, which I propose to call the Crimson Bird of Paradise.

CICINNURUS LYOGYRUS,[1] new species.

Specific characters.—Differs from *C. regius* (Linnæus) in having the pectoral shield nearly four times as long as in the latter, almost as long as broad; frontal plumes shorter, not projecting forward beyond middle of bill and not obscuring contour of skull; tail emarginate instead of rounded; outer web at end of central tail-shafts only two-thirds as wide near base, the width uniform for the greater portion of its length, instead of narrowing rapidly to tip, much more loosely coiled, the apical portion of naked, crossed tail-shafts divergent instead of convergent. The crimson of back is darker, crown and forehead orange-vermilion instead of orange-chrome; pectoral tufts darker and subterminal buff line on each plume much narrower, darker, and less conspicuous; pectoral shield, except a narrow edging on lower border, and tips of central tail-feathers grass-green instead of emerald-green, and tips of pectoral plumes yellowish emerald-green instead of gold-green. The primaries are also a duller orange-rufous.

Description.—Above glossy crimson, darker than in *C. regius*, the head pale orange-vermilion; feathers of the crown and forehead short, not obscuring the contour of the skull, the frontal feathers not extending forward beyond middle of bill; a dark green, almost black, spot above and bordering the eye. Throat, and sides of head and neck, dull crimson with purplish reflections, the feathers on lower border of throat narrowly tipped with buff, forming a convex line; fore neck and upper breast with a broad shield of metallic grass-green 65 millimeters in length, the feathers of lower border narrowly tipped with metallic

[1] Λύω, I loose; γῦρος, whorl, referring to the tips of central tail-shafts.

emerald-green; on each side of upper breast is a tuft of long, apically-rounded, broccoli brown plumes, most of which are tipped with brilliant metallic yellowish emerald-green, each feather with a very narrow, inconspicuous buff line and a second, still narrower, coppery-brown one just before the green tip; outer webs of some of these plumes slightly washed with orange-rufous near base; lower breast, belly, and under tail-coverts white; under wing-coverts white. Scapulars crimson. Wings orange-rufous, the outer webs of primaries and outer secondaries edged with orange-vermilion, the inner secondaries and secondary coverts heavily washed with that color, primary coverts less heavily so. Upper tail coverts extending almost to tip of rectrices, orange-rufous, washed with orange-vermilion; tail emarginate, broccoli brown, the outer webs of feathers bordered with orange-rufous. Central pair of tail-feathers with their shafts crossed near base, greatly elongated, the webs very narrow basally, and entirely wanting beyond tips of other rectrices, except on the apical 70 millimeters of shaft, where there is a loosely-coiled, metallic grass-green outer web, whose greatest width is 8 millimeters; width of this web uniform for the greater portion of its extent; apical portion of naked, crossed shafts divergent. The green of these outer webs, as also that of pectoral tufts and shield, appears violet when held in Gadow's "Position C."[1] Wing, 200 mm.; tail (exclusive of central shaft-wires), 78 mm.; central pair of tail-feathers (straightened to extreme tips), 330 mm.; culmen, 42 mm.; tarsus, 50 mm.; middle toe, 37 mm.

Type.—No. 124628, U.S.N.M.; "New Guinea," received from A. Boucard.

The following table will serve to show the important structural differences between the two species:

Comparison of Cicinnurus lyogyrus with C. regius.

	C. regius.	*C. lyogyrus.*
Pectoral shield	One-fourth as long as broad	Nearly as long as broad.
Frontal plumes	Long, obscuring contour of head, reaching forward beyond middle of bill.	Short, not obscuring contour of head, not reaching beyond middle of bill.
Tail	Rounded	Emarginate.
Central tail-shafts	Crossed near base, converging before tips.	Crossed near base, diverging before tips.
Outer web at tips of central tail-shafts.	Tightly coiled, discoid; greatest width, 12 mm., rapidly narrowing to tip.	Loosely coiled; greatest width, 8 mm., uniform for greater portion of length.

It is unfortunate that the specimen is not accompanied by a more definite locality, so that some light might be thrown upon the habitat of the species. It would appear that it is either very rare or that it inhabits some little-explored portion of New Guinea proper or, possibly, some other island of the Papuan group.

The Hon. Walter Rothschild has recently[2] separated specimens of *C.*

[1] In this position the bird is held on nearly the same level with, and between, the eye and the light. The other metallic colors given in this description appear when the bird is held in "Position B," the eye being between the light and the bird, and the parts described placed vertically to the light.

[2] Novitates Zoologicæ, III, 1896, p. 10.

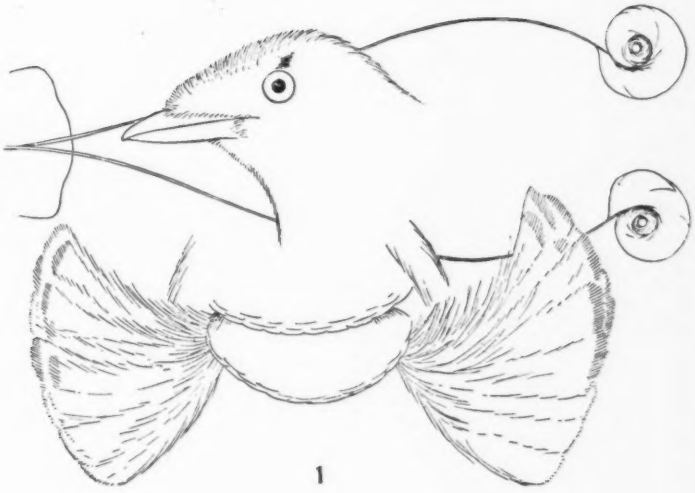
regius from Jobi Island under the subspecific name *coccineifrons*. This form is said to differ from true *regius* "in having the short feathers on the bill produced farther towards the tip, thus leaving a smaller piece of the bill unfeathered; in having these feathers a little longer, much darker, and of the same colour as the back." There are about thirty specimens of *regius* in the National Museum; all of these, however, seem to be typical, consequently I have had no opportunity of examining the subspecies.

The figures of the old pre-Linnæan authors, though very poor, undoubtedly refer to *C. regius*.

EXPLANATION OF PLATE XVII.

Fig. 1. Pectoral shield, head, and tail of *Cicinnurus regius*.

2. Pectoral shield, head, and tail of *Cicinnurus lyogyrus*



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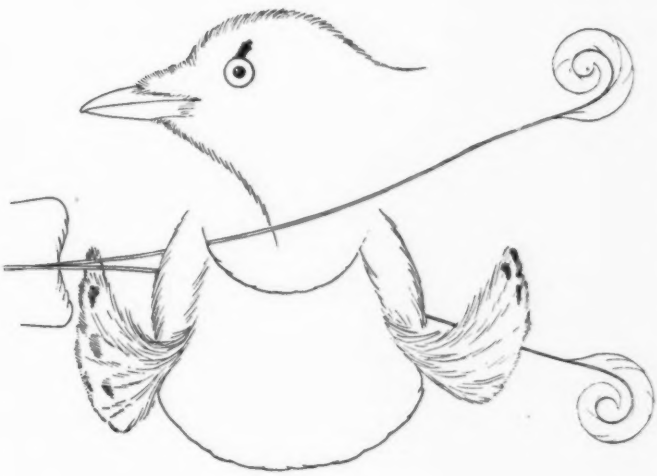


2

A NEW BIRD OF PARADISE.

FOR EXPLANATION OF PLATE SEE PAGE 499.

SYNOPSIS OF THE NAIADES, OR PEARLY FRESH-WATER MUSSELS.

By CHARLES TORREY SIMPSON.
Aid, Division of Mollusks.

In 1836 Dr. Isaac Lea published a Synopsis of the Family of Naiades, which was followed by a second edition in 1838, a third in 1852, and a fourth in 1870. In this work Dr. Lea did not attempt to make any systematic classification, but divided the species into two great genera, *Margaron* and *Platiris*, and subdivided these genera into subgenera, and finally into smaller groups founded on the presence or absence of a dorsal wing, and on the form and sculpture of the shell. This arrangement was regarded by Dr. Lea as merely a temporary one, to be used until a knowledge of the soft parts could be obtained, on which to base a permanent classification.

Several other attempts at a classification of the Naiades have been made, and among these is that of Swainson in 1840, who believed that the whole family formed a circular group, that by beginning at a certain point in it the species or genera would be found closely related to others, and these to others still, and that by following up the chain of relationships one would be brought back to the place of starting. My studies have not borne out Swainson's conclusions, but I have adopted two of his divisions of the Unionidæ, the subfamilies Unioninæ and Hyrianæ. His subfamilies Anodontinæ and Alasmodontinæ have no value, and the subfamily Iridinæ belongs in the family Mutelidæ.

In 1847 Gray gave a classification of the Naiades in his List of Recent Genera, in which he divided them into three families: Unionidæ, with the genera *Anodonta*, *Margaritana*, *Monocondylæa*, *Unio*, *Barbala*, *Lamproscapha*, *Anodonta*, *Byssanodonta*, and *Glabaris;* Mutelidæ with *Mutela*, *Leila*, *Pleiodon*, *Paxyodon* and *Prisodon*, and Mycetopodidæ, with the genus *Mycetopus*.

Troschel, in 1847, proposed a classification in which the genera were founded on anatomical characters, and though for lack of knowledge

he was led into several serious errors, his work has proved an important aid in classification.

H. and A. Adams followed with a classification in 1857, in which they recognized the families Unionidæ and Mutelidæ, dividing the former into two subfamilies, Unioninæ and Mycetopinæ, and giving a list of the then known species.

Agassiz, in 1852, published a classification of the North American Unionidæ, based more especially on the anatomy, but much of his work was hasty and careless, and as a result his groups are, for the most part, heterogeneous assemblages of unrelated species.

In 1893, von Ihering published his Najaden von San Paulo, in which he showed that while certain of the Naiades began their existence on hatching from the egg as a *glochidium*, with a bivalve shell capable of containing the soft parts, others developed into a *lasidium*, with three segments, the middle one alone having a single shell. He showed that the presence or absence of siphons by which the Mutelidæ had been separated from the Unionidæ was not a constant character, even in individual species, and placed the genera which he believed to have glochidia in the family Unionidæ, and those with lasidia in the Mutelidæ. I consider this the most important discovery that has yet been made in the study of the Naiades.

In 1896 the writer published a classification of the Naiades, based largely on his studies of shell characters. In that it was shown that throughout one great group all the genera had shells with schizodont hinge teeth or vestiges of them, and in the rest, a smaller group, they all had taxodont teeth, or vestiges of them. As all the genera whose shells have schizodont teeth were believed by von Ihering to possess a *glochidium*, and those with taxodont teeth have a *lasidium*, it seemed as though there was a natural division of the *Naiades* into two families Unionidæ and Mutelidæ.

Some years ago the Rev. and Mrs. L. T. Chamberlain, son-in-law and daughter of Dr. Lea, suggested to Mr. Dall that a new edition of the Synopsis, or if necessary a new work, should be prepared, and for this purpose they generously offered to contribute such sums as might be needed for the purchase of material to add to the great collection left by Dr. Lea to the U. S. National Museum at his death, and for literature that might be required in preparing the work. As the writer had made a special study of the Naiades, the task of preparing the new Synopsis fell to him. Since then Mrs. Chamberlain has been called away by death, greatly regretted, but her husband has continued to cheerfully furnish all the needed funds for carrying on the work to completion.

While the labor of preparing the synopsis has been arduous, and while it has been impossible to obtain material needed in many important groups, or all the necessary literature, I feel that my opportunities for study have been exceptionally good. I have had constant access to the great collection of Dr. Lea, the finest, no doubt, ever

made of the Unionidæ, and containing more types than any other in existence. In addition to this the U. S. National Museum possesses a large collection, including many types, and for the most part carefully determined by that able student Dr. James Lewis, as well as the entire Jeffreys collection. A great amount of valuable material has been lately added to it, including the Morelet collection of Naiades, a set of Burmese shells from Fea, a series of New Zealand forms from Suter, a large number of species from von Ihering, from South and Central America and Mexico, the entire series of types of Mr. S. H. and B. H. Wright, and types from many other sources. The writer has personally examined the collections of Say, Conrad, and Rafinesque, in the Academy of Natural Sciences in Philadelphia, as well as the excellent alcoholic series which was the basis of all of Dr. Lea's studies. Through the courtesy of the officers of the New York State Museum of Natural History the entire collection of Naiades of Dr. Gould was loaned to the U. S. National Museum, in order that he might study it. Besides this he has examined the fine collections of Mr. Bryant Walker, Mrs. George Andrews, Prof. A. G. Wetherby, and a great amount of material belonging to Mr. William A. Marsh, Mr. B. H. Wright, and many others. He has made critical examinations of the soft parts of more than four hundred species, American and foreign.

Aside from the careful work of Lea, Troschel, and Pelseneer, little has been done in the way of studying the anatomy of the Naiades. The soft parts of a good many foreign species have been examined, and descriptions published which do not describe. Authors have gone into details of the color of the organs and of insignificant characters, but have paid no attention to really important points.

In my paper on The Classification and Geographical Distribution of the Pearly Fresh-water Mussels,[1] I placed a great variety of forms under the generic name *Unio*. Since that time additional knowledge, gained largely from a study of the soft parts, has led me to the belief that it would be best to dismember this genus somewhat as the old group *Helix* has been dismembered by Pilsbry. Ordinarily the soft parts of most of the Unionidæ show but slight differential characters, but at the time when the ovules pass down into the gills a most remarkable change in those organs generally takes place. In the *Anodonta edentula* of Say, short, horizontal ovisacs are developed, which run directly across the animal, and which at maturity break through the outer walls of the outer gills and pass with their young entire into the water. In the forms typified by *Unio anodontoides* the young are contained only in very distinct vertical or oblique ovisacs in the hinder part of the outer gills; in *Unio crassidens*, *pictorum*, and the like, the embryos fill the entire outer gills, forming thick, smooth pads; in *Unio metanevrus*, *trigonus*, *multiplicatus*, and allied forms, they occupy all four of the branchiæ throughout. In *Unio phaseolus* the smooth outer

[1] Proc. U. S. Nat. Mus., XVIII, 1896, pp. 295–343.

gills begin to be crimped as they are being filled with embryos, until when full, they become a series of marvelous folds. In *U. irroratus* several ovisacs in the center of the outer gills grow out to a great length, become filled with young, and are closely coiled. In *U. cornutus* a few central ovisacs develop so as to project below in a long, straight flap. In all the South American and Australian Unios, so far as is known, the inner gills alone, as a rule, are filled with young, and this is probably the case with the species of the Ethiopian region and most of those of southeastern Asia. After the young have passed out into the water the gills of all the species change back into their ordinary condition, and when not gravid there is great similarity in those of most of the species formerly classed as Unios.

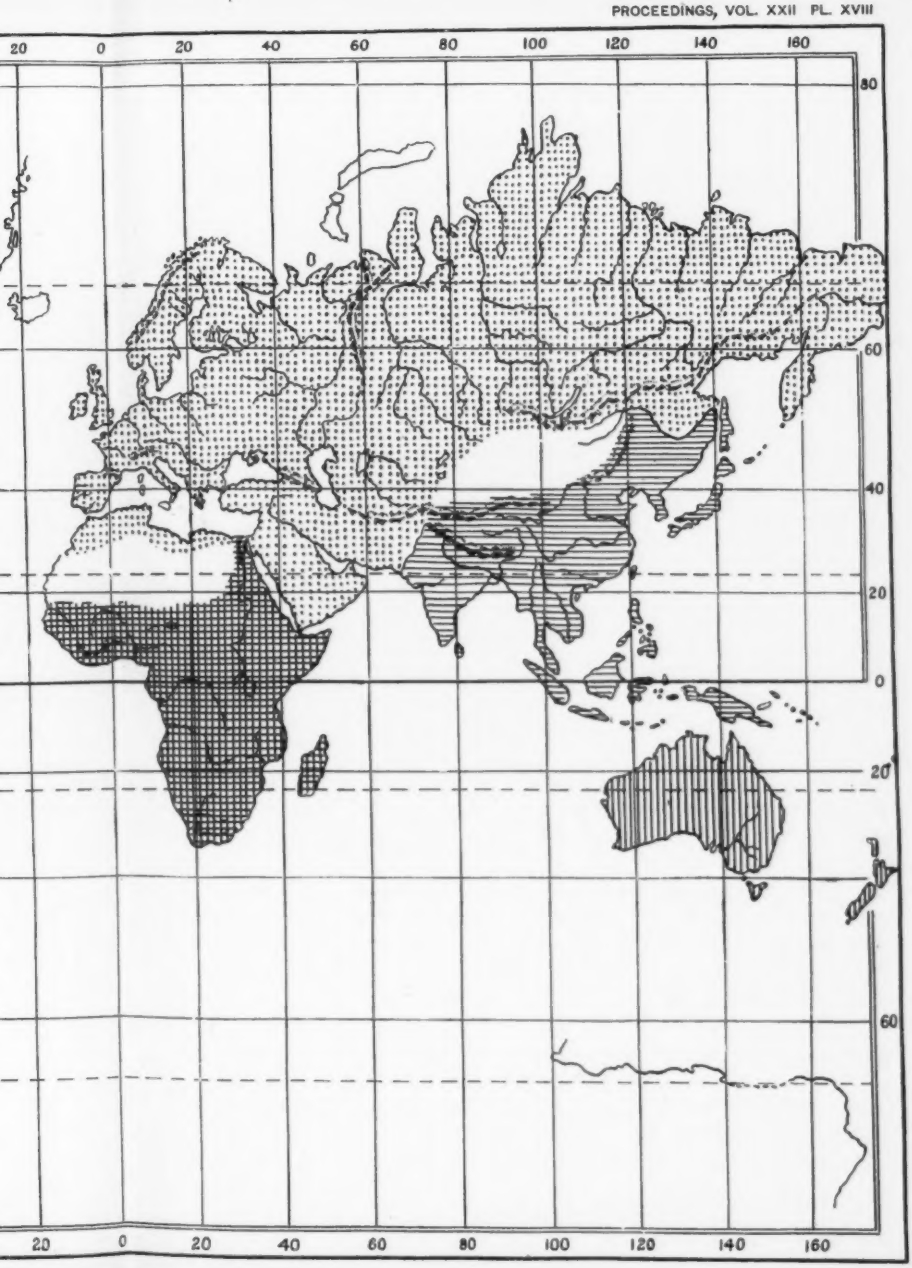
These peculiar evanescent characters, assumed when the gills are transformed into marsupia, seem to be quite constant, and I believe they can be used as a basis for the foundation of genera. When these are once discovered and understood it will be found, on careful examination, that there are minor shell characters that correspond with those of the marsupia, and which help us in placing certain forms of whose anatomy we know but little. Thus the principal shell characters of such species as *Unio trigonus*, *metanevrus*, and *plicatus* are much like those of *U. gibbosus*, *crassidens*, and *buckleyi*. But in the former set all four gills will be found to be filled with young in the gravid female, while in the latter only the outer ones are full. And the former have generally shorter, solider, more inflated shells and *deep beak cavities*, while the latter have longer, lighter shells, which have *shallow beak cavities*. In *Anodonta edentula* the ovisacs are short and run across the gills; in the very similar looking *A. ferussaciana* the outer gills are filled with oblique ovisacs, and the inner have (at least in some cases) more or less ovules. The beak sculpture of these two species is very different.

From the earliest period in which the Naiades have been studied to the present time it has been claimed by some that the sexes were separate, by others that the animals were hermaphroditic. Recent careful studies by such men as Sterki, Taylor, Kelly, and others appear to demonstrate that in the more highly organized Unionidæ (those which have two forms of shells, and have the ovisacs in the hinder part of the outer gills) the sexes are always separate. In the more simply organized Unionidæ (those with but one form of shell and with the embryos occupying the entire gill) the sexes may or may not be separate.

Further study has shown me that the provinces established in the paper I have quoted hold good as there laid down. There is evidently a very close relationship between many of the unionoid forms of southeastern Asia and tropical Africa. So close is this relation that the two regions might be united if it were not for the fact that a large

U. S. NATIONAL MUSEUM

MAP SHOWING THE DISTRIBUTION OF



E DISTRIBUTION OF PEARLY FRESH-WATER MUSSELS

number of forms are found in each of them that are not at all closely related to any of those of the other.

These regions may be tabulated as follows:

AREAS OF THE NAIAD REGIONS.[1]

Palearctic	Europe.
	Northern and Western Asia.
	North Africa to the Desert.
	Pacific drainage of North America.
Ethiopian	Africa, south of the Sahara.
Oriental	Asia, south of the Himalayas.
	East Indies to the Solomon Islands.
Australian	Australia.
	Tasmania.
	New Zealand. Part of New Guinea.
Neotropical	South America.
Central American	Central America.
	Mexico, east of the Cordillera.
	Cuba.
Mississippian	Entire Mississippi Valley and the Gulf drainage from west Florida to the Rio Grande.
	Mackenzie River system.
	Red River of the North.
	Great Lakes.
Atlantic	Lower St. Lawrence and rivers of eastern Canada.
	Atlantic drainage of the United States.

I have hesitated long before placing a considerable number of the species of Southeastern Asia in and near North American genera. I had hoped to be able to examine the soft parts of a number of these Oriental forms, but have been disappointed, and as nothing is known of the anatomy of most of them I have been compelled to classify by shell characters alone. It is certain that the beak sculpture of a large number of Naiades of this area is essentially concentric, and *not* zigzag radial, as it is in most of the forms of the Oriental region. The shell characters of the ponderous Chinese Uniones are certainly much like those of *Quadrula* in the form, the teeth, the beak sculpture, and especially the deep, compressed beak cavities. A great number of fossil forms from the Tertiary strata of Asia and Eastern Europe seem to show the closest relationship to the American Quadrulas. *Hyriopsis*, *Cristaria*, *Chamberlainia*, and *Pilsbryoconcha* seem to be related by shell characters to the alate forms of *Lampsilis*, and even the strange *Pseudospatha* of Africa would appear to belong here.

I recognize about one thousand species and 82 varieties of Unionidæ, having reduced to the synonymy a great many names that most authors have believed to stand for valid species. Of these, 533 species and 55 varieties belong in North America and 101 in South America. The list contains 117 species of Mutelidæ and 11 varieties, and of these 80

[1] For map of Naiad Regions see plate.

species are South American. The following list shows the number of species in each genus and the distribution of the genera:

UNIONIDÆ.

19 Truncilla, United States.
3 varieties.
2 Micromya, United States.
8 varieties.
128 Lampsilis, North America.
4 Pseudospatha, Tropical Africa.
10 Hyriopsis, Eastern Asia.
3 Chamberlainia, Southeastern Asia.
10 Cristaria, Eastern Asia.
2 Lepidodesma, Eastern Asia.
4 Pilsbryoconcha, Southeastern Asia.
6 Medionidus, United States.
22 Nephronaias, Mexico, Central America, Cuba.
1 Glebula, United States.
9 Obovaria, United States.
1 variety.
8 Plagiola, North America.
2 Tritogonia, United States.
1 variety.
2 Cyprogenia, United States.
1 variety.
1 Obliquaria, United States.
6 Ptychobranchus, United States.
8 Strophitus, North America.
1 variety.
55 Anodonta, North America, Eastern Asia, Palearctic.
8 varieties.
4 Colletopterum, Southeastern Europe.
3 Gabillotia, Asia Minor.
1 variety.
7 Leguminaia, Southern Europe, Asia Minor.
1 variety.
1 Lastena, United States.
9 Solenaia, Eastern Asia.
1 Gonidea, United States.
1 Anodontoides, North America.
2 varieties.
1 Pegias, United States.
1 Arcidens, United States.
7 Symphynota, North America.
1 variety.
13 Alasmidonta, North America.
1 Hemilastena, United States.
6 Margaritana, Circumboreal.
145 Unio, North America, Palearctic.
13 varieties.
72 Pleurobema, United States.
1 variety.
99 Quadrula, North America, Eastern Asia.
12 varieties.
2 Schistodesma, Eastern Asia.
1 Gibbosula, Eastern Asia.
5 Cuncopsis, Eastern Asia.
90 Nodularia, Eastern Asia, Asia Minor, Tropical Africa.
6 varieties.
1 Harmandia, Southeastern Asia.
8 Physunio, Southeastern Asia.
7 Dalliella, Southeastern Asia.
11 Grandidieria, Tropical Africa.
23 Pseudodon, Eastern Asia.
1 variety.
38 Parreysia, Southeastern Asia, Tropical Africa.
8 varieties.
5 Ptychorhynchus, Eastern Asia.
1 variety.
3 Virgus, Southeastern Asia.
2 Ctenodesma, Southeastern Asia.
5 Rectidens, Southeastern Asia.
12 Lamellidens, Southeastern Asia, Tropical Africa.
5 varieties.
5 Trapezoideus, Southeastern Asia.
1 variety.
3 Arconaia, Eastern Asia.
1 Pseudavicula, Tropical Africa.
1 Arcidopsis, Southeastern Asia.
9 Tetraplodon, South America.
1 variety.
5 Castalina, South America.
1 Callonaia, South America.
4 Hyria, South America.
8 Prisodon, South America.
94 Diplodon, South America, Australasia, South Africa.
6 varieties.

MUTELIDÆ.

27 Spatha, Tropical Africa.
3 varieties.
9 Mutela, Tropical Africa.
2 Chelidonopsis, Tropical Africa.
5 Brazzæa, Tropical Africa.
4 Pleiodon, Tropical Africa.

10 Monocondylæa, South America.	53 Glabaris, South America.
4 Iheringella, South America.	8 varieties.
2 Fossula, South America.	8 Mycetopoda, South America.
3 Leila, South America.	

Total: 61 genera of Unionidæ; 11 genera of Mutelidæ.

I am inclined to believe with von Ihering that the primitive beak sculpture of the Unionidæ was radial, and in two species of Unios from what are believed to be Triassic or Permian strata of the Staked Plains of Texas,[1] which are probably the oldest forms known, the beaks clearly show *strictly radial sculpture*. Four other species from the same lot are not in condition to exhibit this character.

Now I take this to belong to the simplest, earliest, and most lowly organized form of unionoid life. I believe that the earlier Unios had the young contained in the inner branchiæ alone, that there has been a gradual development from these primitive forms with simple, dull-colored, smooth shells, those of the male and female being alike, with radially sculptured beaks, the *Endobranchs*, up to the highest forms of to-day, with concentric, doubly looped beak sculpture, with highly painted shells, in which those of the male and female are very different, with the young contained in distinctly marked ovisacs in the hinder part of the outer gills alone, the *Exobranchs*.

The data for following these developments and the migrations of the *Naiades* are meager so far as fossil material is concerned. But, fortunately, while among the higher orders of life genera and even families appear, develop, grow old, and become extinct in a single geological age, the Unionidæ have held on unbroken from the Triassic or probably an earlier geological age until now, and while there has been slow progress in the development of higher characters *the primitive forms have not died out*. I know of no important type of the family among the fossil species that may not be found somewhere to-day among the living ones. They seem to have migrated to a certain region, made a slight advance over the characters of their predecessors, and to have continued down with but little change until to-day. When a new migration was made the same thing was enacted again.

If the Unionidæ originated in North America during the Triassic or some earlier period we may suppose that some members of the family migrated into South America during that or at a later period. All the species of that family in South America have radial beak sculpture (except *Callonaia* and *Prisodon*, in which the beaks seem to be smooth), and the young are contained in the inner gills alone, so far as we know. In some cases this sculpture is strictly radial; more often we find the central or all the bars curving a little toward each other below, and one or two of the middle pairs coalescing, the first move toward concentric beak sculpture. By an old, now partly submerged land bridge in the Antarctic region it is probable that a migration took place from South

[1] Proc. U. S. Nat. Mus., XVIII, 1896, pp. 381-385.

America to New Zealand and Australia, and slight changes in the way of progress are shown there. The beak sculpture is still radial, but the bars are decidedly curved toward each other below; they become slightly broken or nodulous, and each set is generally removed from the other a little, so that a space in the middle of the young shell is smooth. The young are contained in the inner gills, though Suter reports a few in the outer gills of one or two species and in all these Southern Hemisphere forms the shell has a dull color, and is nearly or quite rayless. Another migration took place to Southeastern Asia, and from there there was another to tropical Africa, possibly from Southern India over an old but now lost landway. In the forms of this region the beak sculpture becomes irregularly and variously zigzag radial, the surface is nodulous in many cases, and the shell is often bright colored and painted. Some of the recent species, such as *Unio crispisulcatus*, show nearly strict radial sculpture all over the shells; others which I have placed in the genus *Lamellidens* have almost such sculpture as is seen in the beaks of the Australian forms. In others the sculpture becomes slightly nodulous. Reasoning from analogy, and the few gravid specimens I have examined of these forms with the zigzagged beak sculpture, I presume that they all carry the young in the inner gills, though it is quite probable that some of them may have them in all four gills, and this would be a step in an upward direction. Some of these Asiatic and African forms with zigzag sculpture are quite short, inflated, and solid, and, in general, show characters strongly allied to those of our heavy Mississippi Valley forms (the latter of which I place in *Quadrula*), the various members of the genus *Parreysia*, for example.

It is quite probable that from such forms the genus *Quadrula* sprung; that it developed in Asiatic streams, where it still seems to be represented. In the Tertiary strata of eastern Europe and in parts of Asia this genus seems to be abundantly represented. It is a little difficult to say from some of the living Asiatic forms whether the beak sculpture should be called sharply, doubly looped, or zigzag radial, and the same thing may almost be said of some of our North American forms. There probably existed at that period an old land way across from northeastern Asia to northwestern North America, and one which lasted a long time, or it may have been submerged and then reappeared again, for through long ages this has apparently been a highway for migrating Unionidæ. I think it not unlikely that the immediate progenitors of the magnificent and diversified series of Uniones found fossil in the Laramie beds came over from Asia among the earlier migrations; for it is a significant fact that among the Uniones of the Laramie formation in the United States we have a number of species which in general form closely resemble these recent Asiatic Parreysias, and that their beak sculpture is decidedly zigzag radial, just as it is to-day in these oriental forms. Associated with these Laramie species are others in

which the beak sculpture is somewhat concentric and of a peculiar pattern seldom found among living Uniones, the ridges being nearly straight below and sharply pointed behind in a chevron-shaped pattern.

I take it that the next step of progress was the development of the genus *Pleurobema*, or forms which are nearly allied to it; though the strange, smooth, elongated, wedge-shaped *Cuneopsis*, with its remarkably deep beak cavities and often distorted shells, and the curious *Gibbosula* seem like Quadrulas making an effort to shape their shells something like those of Unio. In *Pleurobema* the shell is solid and rather triangular, the beaks are high and typically well forward, the beak sculpture is broken, but most nearly concentric, the beak cavities are shallow, and the young occupy only the outer branchiæ. There are great numbers of species I should refer to this or closely allied genera in the oriental tertiaries, and many of them are knobbed. To-day the genus is confined to the Mississippi Valley and the northern drainage of the Gulf of Mexico, and all the species are smooth except *P. æsopus* and *P. varicosa*, which I place in the genus with some hesitation.

This genus has an immense development in the waters of the Tennessee drainage, becoming less abundant as we advance northward, until in the Ohio River and its tributaries only three species are found, *Pleurobema clava* Lamarck, *P. varicosa* Lea, and *P. æsopus* Green. In the Tennessee and Cumberland systems all the species except the two last mentioned belong to the group typified by *P. clava*. In the Alabama River drainage and a few adjacent streams emptying into the Gulf there is a great development of this genus, but none of the species belong to the *clava* group. Now, if the genus migrated into the Tennessee system from the northwest, and it seems quite probable that it did, its presence in the Alabama River system would seem to prove the theory entertained by some geologists that the Tennessee formerly emptied into the Gulf, flowing down into what is now the Coosa River and into the Alabama. Additional proof of this is found in the fact that quite a number of the common Mississippi Valley species, such as *Unio tuberculatus* Barnes, *U. rectus* Lamarck, *U. trigonus* Lea, *U. anodontoides* Lea, *U. ebenus* Lea, and others are met with in the Tennessee, the Coosa, and the Alabama River systems, and *Unio conradicus* and *U. cumberlandianus*, Tennessee River forms, occur in the Alabama system. That this southern outflow of the Tennessee ceased a long time ago is shown by the fact that in the Alabama drainage all the northern species of Uniones have a peculiar aspect, and several entire groups of *Pleurobema* have developed, which are distinct from anything found in the Tennessee.

It is probable that the true Unios and their allies were next developed, with simple oval to elongated shells, and moderate beaks showing quite a variety of sculpture. It is generally concentric, being inclined to follow the growth lines, but sometimes the ridges are broken, and again they are somewhat doubly looped. The young occupy the outer

gills only, forming a pad-like marsupium. The genus is now found throughout a large part of the Palearctic region and North America generally, excepting the Pacific drainage. The Unios of what seems to be the *Gibbosus* group are abundant in the Tertiary of eastern Europe. *Unio davilai* from Roumania is almost exactly like *U. gibbosus*, a recent species of the Mississippi Valley, and there were species no doubt closely allied in the Tertiary of the western United States. There were forms in Eastern Europe which seemed to connect *Unio* and *Pleurobema*, some of which were like *P. clava* and formed a connecting link with *Quadrula*. There were Quadrulas showing relationship with our *Q. trigona*, *rubiginosa*, *pustulosa*, *pyramidata*, and other forms. *Psilunio craviovensis* looks much like our *Pleurobema æsopus* and there are other striking examples of old forms resembling recent ones.

Now, in *Quadrula*, *Unio*, *Alasmidonta*, and some of the other allied genera we not unfrequently see species or specimens which have the ordinary concentric or doubly looped beak sculpture, and in addition to this a number of fine, regularly radiating ridges in front or behind, or sometimes at each end of the ordinary sculpture, an atavistic development, probably. In some groups this character is quite constant; in others it is only occasionally seen. I have never noticed it in any of the higher genera in which the male and female shells are different.

Up to this point the male and female shells had been essentially alike, and the ovisacks were not distinctly outlined, but formed smooth pads, the marsupium occupying practically the whole gill. In the American waters probably, a great change now began to take place in some of the Unionidæ. The ovisacs of many forms became distinctly marked out by a deep sulcus; a constriction developed in some instances around near the base of the marsupium, inside and out, so that the lower end of the ovisacs resembled little bulbs, and these were often filled with pigment of a different color from the rest of the ovisac. *Ptychobranchus*, with its folded marsupium, may have developed from *Unio; Cyprogenia* and *Obliquaria*, with their narrow central marsupia, and *Dromus*, in which it is hung all around the outer gills in short, distinct ovisacs, would seem to have descended from *Quadrula* by their shell characters. In all of these the shells of males and females are essentially alike. In *Medionidus* there is sometimes quite a well-marked swelling at the central or post-basal part of the female shell which is absent in the male, but sometimes it is impossible to separate the shells of the two sexes. The marsupium consists of irregular ovisacs just behind or almost at the center of the outer gills. In the strange *Tritogonia* the female shell differs remarkably from that of the male, having developed a broad, posterior wing, filled with a flap of the mantle, while that of the male is swollen, and truncate behind. Of the marsupia of this strange form I know nothing. *Oboraria*, with short, solid, full shells, sometimes having a slight post-basal inflation in those of the female, and *Plagiola*, with triangular shells, often showing the distinction between male and female, recall to some extent *Quadrula* in shell characters, but have the marsupia in the hinder part of the outer gills alone. The ovisacs are distinct, and there is a sulcus below, and this

is the highest type of a branchial uterus. *Lampsilis* is a step farther on, with oval to elongated shells, generally highly colored, with, as a rule, a decided post-basal swelling of that of the female, without (in most cases) a strong post ridge, and the beak sculpture consists of rather numerous, delicate bars, arranged in two distinct (anterior and posterior) loops.

Throughout the entire Mississippi Valley, a portion of the Atlantic drainage, in most of the streams flowing into the Gulf of Mexico, in eastern Mexico, and Central America there is found an extensive group of Uniones for which I have used the name *Proptera* of Rafinesque. Nearly all the shells are more or less dorsally winged, the beak sculpture is feeble, the epidermis is dull, the teeth are often imperfect, and they have a row of dorsal scars running obliquely downward and forward. The nacre generally is some shade of purple, and though the female shell may show a decided post inflation, it may be wanting. The ovisacs are usually fine and numerous, and are placed in the posterior ends of the outer gills. I have given this group subgeneric rank under *Lampsilis*. Now, it would seem probable that North America was the field in which these remarkable developments in the character of the Unionidæ had taken place, for I know of no fossil species elsewhere showing any of these higher characters. If, as I have elsewhere suggested, there is a relationship between *Proptera* and the *Cristarias*, *Hyriopsis*, *Pilsbryoconcha*, *Chamberlainia*, and *Pseudospatha* of the Old World, then I should think it likely they, or their progenitors, had migrated thence from North America some time during the early or middle tertiaries. It is possible that the *Cristarias*, *Hyriopsis*, and the like, or closely related but now extinct groups, may have originated in oriental waters, and that the *Propteras*, and the typical *Lampsilis*, may be their offspring.

Truncilla marks the highest development of Naiad life, and may be taken to be the latest. Its shells are smooth and generally highly painted, the beak sculpture is fine and doubly looped, the hinge teeth are well developed. The post-basal area is very distinctly marked out and developed in the female. In most cases the shell of this part in the female is thin, of a different texture from the rest, often radially ridged, and decidedly toothed on its edge. There is usually a surprising difference in the shape of the shells of male and female aside from this, so much so that one would never suppose that they belonged to the same species, unless he traced the growth back to the young shells, which are quite alike in the different sexes. The marsupium is like a large kidney, very full, and totally different in appearance when gravid from the rest of the gill. It appears to be protected by a great flap which grows out from the mantle covering it, which is here double. The genus exhibits a great variety of form, so much so that several good subgeneric groups seem well marked out, and we must believe it has been in existence for some time.

Much of the foregoing may be mere conjecture; much is undoubtedly founded on fact. I believe that the living forms of the Unionidæ show a gradual development from the simplest, lowest, and earliest

types up to the highest, most recent, and most complicated, and stand as a sort of index to the progress of the family in the past.

I have not been able to study the Mutelidæ as carefully as I have the Unionidæ. All the species are foreign, and while I have seen the soft parts of a few South American forms, I have never had the opportunity to examine the anatomy of a single African species. I have not been able, from what knowledge I have obtained, to discover any considerable anatomical or conchological differences between the Mutelid genera of Africa and South America which might be used to separate the family into subfamilies.

I have treated the families of the Unionidæ and Mutelidæ together in this work because they have both been classed as Naiades. But the remarkable differences in the embryos, that of the former family being a glochidium with a bivalve shell inclosing the soft parts, and that of the latter a lasidium divided into three segments with a single shell on its middle section, and the shells of the one family having schizodont teeth, while those of the other have taxodont teeth, seem to show that the two great groups are not very nearly related.

In studying the Naiades I have been greatly perplexed on account of the unsatisfactory and confused condition of much of the literature. Early in this century Rafinesque collected the Unionidæ extensively in Kentucky and published a large number of genera, minor groups, and species.

It is probable that there will always be differences of opinion with regard to his work, just as there have been in the past. His figures are more like those made by children, or the caricatures drawn by aboriginal tribes, than the creations of an intelligent naturalist, and the descriptions are too brief in many cases to give any clear idea of the species. The work in the continuation of his monograph is even worse than that in the body of the paper, and tribes, genera, and subgenera are mingled in bewildering confusion, and all these are placed under two great genera. It is impossible in many cases to tell what his meaning is. I have carefully gone over his so-called types in the Academy of Natural Sciences in Philadelphia, making notes and sketches, and stating the names by which they are commonly known. Four times, separated by long intervals, I have studied his original descriptions, with specimens of the same species as these so-called types, in an attempt to determine his species, each time writing down my conclusions, and I believe that quite a number of his species will have to stand. There can be no doubt whatever that many of his so-called types are not types at all, as they do not fit the descriptions by any stretch of imagination.

In applying generic, subgeneric, and sectional names I have used those which have been previously applied wherever it has been possible to do so by the process of elimination, in order that no claim of priority might be urged for them.

A most unfortunate dispute arose among our earlier conchologists in regard to priority of names, one in which a great deal of ill feeling was displayed. I have endeavored wherever it was possible to ascertain the exact date of publication of these disputed names and to credit the species to the earliest described. In some cases it has been

impossible to tell which of two names appeared first, and in such cases I have used that which seemed to be best known.

Many of the species of Lamarck stand on about the same foundation as those of Rafinesque, having only a brief description and no figures. Dr. Lea on at least two occasions went over the types of most of Lamarck's species and has published his conclusions in the Observations, and I am obliged to abide by his decisions, never having seen the types myself.

One of the most perplexing problems has been the work done by European conchologists, and especially by the so-called new school of France. Previous to 1870, the date of issuance of Lea's last edition of the synopsis, thousands of names had been applied to the few species of Europe. But this work was conservative and reasonable compared with that of the new school since then. I have devoted much time and study to this fauna and its literature. To me it seems that there are not more than eighteen or twenty species of Unionidæ found in Europe, judging by the same standards I have applied to species elsewhere. Nearly all the authors seem to be more or less at sea as to certain forms of this area, and the reasons for this are probably their want of striking characters and their extreme variability. *Unio pictorum*, *tumidus*, *elongatulus*, and *platyrhynchoideus* have been often taken for each other. *Margaritana margaritifera* has repeatedly been mistaken for the very similar looking *M. crassa*, and each of these has been hopelessly confused with *Unio batavus*.

I have endeavored to consider names applied before 1870 in my synonymy. I have made no effort to do this with those applied by authors to the forms of Europe since that time, as I do not believe that any new species of *Unio*, *Margaritana*, *Anodonta*, or *Leguminaia* have been found there in the last thirty years. The genus *Colletopterum* (1881) is a doubtful one and is very likely only an mutation of the excessively variable *Anodonta cygnea*. In 1892 Arnould Locard, one of the great lights of the new school, stated that there were 208 species of Unios and 250 Anodontas in France alone.[1]

Life is too short and valuable to be wasted in any attempt at deciphering such nonsense, and I have not even cumbered the pages of this work with a list of these new species. Those interested can find them in the works of Westerlund and Kobelt.

In cases where the new school has worked on the fauna of Africa or Asia, I have done the best I could to straighten out the synonymy.

I have not attempted to make any analytical key to genera and other groups, because I do not believe that it is possible to construct a key that will be of any real service to the student. At least four-fifths of the shells of the Naiades have the beaks so eroded that it is impossible to form any idea of what their sculpture is like, and the soft parts are inaccessible to the average student and collector. These are both vital characters that must be used in classification. The general arrangement of the groups down to genera is shown in the following table:

[1] Ann. Soc. Ag. Hist. Nat. Lyon, 1892, p. 55.

SYNOPSIS OF THE GENERA OF NAIADES.

Family Unionidæ. Hinge with schizodont teeth; embryo a *glochidium*.

Subfamily Unioninæ. Beak sculpture concentric; embryos in outer or all four of the gills. (*Exobranchia*.)

Ovisacs distinctly marked out by a sulcus.

Male and female shells different.

(*Heterogenæ*.)

Female shell inflated at base in front of posterior ridge; marsupium in hinder part of outer gills.

- *Truncilla* Rafinesque.
- *Micromya* Agassiz.
- *Lampsilis* Rafinesque.
- *Pseudospatha* Simpson.
- *Hyriopsis* Conrad.
- *Chamberlainia* Simpson.
- *Cristaria* Schumacher.
- *Lepidodesma* Simpson.
- *Pilsbryoconcha* Simpson.
- *Medionidus* Simpson.
- *Nephronaias* Crosse and Fischer.
- *Glebula* Conrad.
- *Obovaria* Rafinesque.
- *Plagiola* Rafinesque.

(*Digenæ*.)

Female shell inflated behind, above posterior ridge.

- *Tritogonia* Agassiz.

Male and female shells alike.

(*Mesogenæ*.)

Marsupium a few ovisacs in the center of outer gills.

- *Cyprogenia* Agassiz.
- *Obliquaria* Rafinesque.

(*Ptychogenæ*.)

Marsupium occupying the whole outer gills in a series of folds.

- *Ptychobranchus* Simpson.

(*Eschatigenæ*.)

Marsupium occupying the outer border of outer gills.

- *Dromus* Simpson.

(*Diagenæ*.)

Ovisacs filling the outer gills, running crosswise.

- *Strophitus* Rafinesque.

Ovisacs not separated by a sulcus.

Male and female shells alike.

(*Homogenæ*.)

Marsupium filling the entire outer gills and forming smooth pads.

- *Anodonta* Bruguiere.
- *Colletopterum* Bourguignat.
- *Gabillotia* Servain.
- *Leguminaia* Conrad.
- *Lastena* Rafinesque.
- *Solenaia* Conrad.
- *Gonidea* Conrad.
- *Anodontoides* Simpson.
- *Pegias* Simpson.
- *Arcidens* Simpson.
- *Symphynota* Lea.
- *Alasmidonta* Say.
- *Hemilastena* Agassiz.
- *Margaritana* Schumacher.
- *Unio* Retzius.
- *Pleurobema* Rafinesque.

(*Tetragenæ*.)

Marsupium filling all four gills, forming smooth pads; beak cavities deep.

- *Quadrula* Rafinesque.
- *Schistodesma* Simpson.
- *Gibbosula* Simpson.
- *Cuneopsis* Simpson.

- Family Unionidæ. Hinge with schizodont teeth; embryo a *glochidium*.
  - Subfamily Hyriannæ. Beak sculpture radial; male and female shells alike; marsupium filling the inner gills. (*Endobranchiæ.*)
    - (*Rosanorhamphus.*) Beak sculpture generally zigzag-radial; epidermis often bright.
      - *Nodularia* Conrad.
      - *Harmandia* Rochebrune.
      - *Grandidieria* Bourguignat.
      - *Physunio* Simpson.
      - *Dalliella* Simpson.
      - *Pseudodon* Gould.
      - *Parreysia* Conrad.
      - *Ptychorhynchus* Simpson.
      - *Virgus* Simpson.
      - *Ctenodesma* Simpson.
      - *Rectidens* Simpson.
      - *Lamellidens* Simpson.
      - *Trapezoideus* Simpson.
      - *Arconaia* Conrad.
      - *Pseudaricula* Simpson.
      - *Arcidopsis* Simpson.
    - (*Lamphorhamphus.*) Beak sculpture radial, often curved; shell dull colored.
      - *Tetraplodon* Spix.
      - *Castalina* von Ihering.
      - *Castaliella* Simpson.
      - *Callonaia* Simpson.
      - *Hyria* Lamarck.
      - *Prisodon* Schumacher.
      - *Diplodon* Spix.
- Family Mutelidæ. Hinge teeth taxodont; male and female shells alike; embryo a *lasidium*.
  - *Spatha* Lea.
  - *Mutela* Scopoli.
  - *Chelidonopsis* Ancey.
  - *Brazzæa* Bourguignat.
  - *Pleiodon* Conrad.
  - *Monocondylæa* d'Orbigny.
  - *Iheringella* Pilsbry.
  - *Fossula* Lea.
  - *Glabaris* Gray.
  - *Leila* Gray.
  - *Mycetopoda* d'Orbigny.

In the preparation of this work I have received uniform courtesy and kindness from students and collectors generally. I am under especial obligations to Mr. Edgar A. Smith, of the British Museum, for examining and reporting on the original manuscript of Solander, and to Mr. H. A. Pilsbry, of the Academy of Natural Sciences of Philadelphia; Mr. A. G. Wetherby, of Magnetic City, North Carolina; Dr. H. von Ihering, Museo Paulista, San Paulo, Brazil; and Mr. H. Suter, Christ Church, New Zealand, for repeated assistance and advice. Mr. L. E. Daniels, of La Porte, Indiana; Mrs. George Andrews, of Knoxville, Tennessee; Hon. J. D. Mitchell, of Victoria, Texas; Mr. Berlin H. Wright, of Penn Yan, New York; Mr. Bryant Walker, of Detroit, Michigan; Dr. W. S. Strode, of Lewistown, Illinois; Mr. H. M. Kelly, of Mount Vernon, Iowa; Mr. William Moss, of Ashton-under-Lyne, England; and many others have contributed valuable material for study.

SYSTEMATIC ARRANGEMENT OF THE NAIADES.

Family UNIONIDÆ.

Shell nacreous, with a thick epidermis; beaks usually sculptured, often showing the remains of the nuclear shell; ligament opisthodetic; hinge with or without teeth, though with vestiges of them in every genus; when present schizodont and arranged as pseudocardinals and laterals; palleal line usually simple; prismatic border ordinarily narrow.

Animal with labial palpi almost always wider than long; anal opening usually separated from the superanal; embryo a glochidium, the soft parts being inclosed in a bivalve shell, and borne in the inner or outer or all four leaves of the branchiæ.

Subfamily UNIONINÆ Swainson, 1840. (Exobranchiæ.)

Shell having essentially concentric beak sculpture.

Animal with labial palpi somewhat drawn out, projecting posteriorly; embryos borne in the outer or in all four gills.

HETEROGENÆ.

Male and female shells different, the latter inflated in the post-basal region; beak sculpture usually doubly looped; embryos contained in ovisacs separated by a sulcus and occupying the hinder part of the outer gills.

Genus TRUNCILLA Rafinesque, 1819.

(Type, *Truncilla triquetra* Rafinesque.)

Truncilla RAFINESQUE, J. de Phys., Chimie, Hist. Nat., LXXXVIII, 1819, p. 427.

Shell rounded or oval, solid, inflated, generally smooth and rayed, with delicate beak sculpture which has a tendency to be doubly looped, that of the female having a very decided inflation in the post-basal region, which is thinner than the rest of the shell, of different texture, often toothed, and usually radiately sculptured; laterals double in each valve, the inner in the right valve smaller. Animal generally having the inner gills united to the abdominal sac; female with a heavy flap of the mantle which fills the post-basal swelling of the shell, and which has an inner ridge inside at some distance above the edge; marsupium very distinct, occupying the swollen part of the shell.

Subgenus TRUNCILLA Rafinesque, 1819.

Shell covered with broken rays, somewhat triangular, and without a wide, radiate, posterior furrow.

(Group of *Truncilla triquetra.*)

Shell greatly inflated, sharply truncate posteriorly; inflation of the female shell at extreme post-basal point.

[1]† **TRUNCILLA TRIQUETRA** Rafinesque.

[2]* *Truncilla triqueter* RAFINESQUE, Ann. Gen. Sci. Phys. Brux., XIII, 1820, p. 300, pl. LXXXI, figs. 1–4.—*CHENU, Bib. Conch., 1st ser., III, 1845, p. 15, pl. II, fig. 1.—*AGASSIZ, Arch. für. Naturg., I, 1852, p. 44.

Unio triqueter SHORT and EATON, Transylvania Jl., 1831, p. 79.—*SAY, Am. Conch., VI, 1834.—*CONRAD, New F. W. Shells, 1834, p. 72.—*FERUSSAC, Guer. Mag., 1835, p. 27.—*SAY, Pr. Ac. N. Sci. Phila., VI, 1853, p. 259.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 496.—*PÆTEL, Conch. Sam., III, 1890, p. 170.

† *Unio triangularis* BARNES, Am. Jl. Sci., VI, 1823, p. 272, pl. XIII, fig. 17.—*HILDRETH, Am. Jl. Sci., X, 1828, p. 287, fig. —*SAY, Am. Conch., No. 1, 1830, pl. IV.—SHORT and EATON, Transylvania Jl., 1831, p. 78.—*DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 554; 3d ed., II, 1839, p. 674.—*REEVE, Conch. Syst., I, 1841, p. 118, pl. LXXXIX, fig. 9.—*HANLEY, Test. Moll., 1842, p. 183; *Biv. Shells, 1843, p. 183.—*CATLOW and REEVE, Conch. Nom., 1845, p. 64.—*CHENU, Bib. Conch., 1st ser., III, 1845, p. 10, pl. I, figs. 4, 4*b*; *Man., II, 1859, p. 137, fig. 662.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXVII, fig. 340.—*CALKINS, Pr. Ottawa Acad. Nat. Sci., 1874, p. 45.

**Mya triangularis* EATON, Zool. Text Book, 1826, p. 221.

**Margarita (Unio) triangularis* LEA, Syn., 1836, p. 18; 1838, p. 16.

**Margaron (Unio) triangularis* LEA, Syn., 1852, p. 23; 1870, p. 36.

**Unio cuneatus* SWAINSON, Phil. Mag., 1823, p. 112.

**Unio formosus* LEA, Trans. Am. Phil. Soc., IV, 1834, p. 111, pl. XVI, fig. 41; *Obs. I, 1834, p. 121, pl. XVI, fig. 41.—*CHENU, Ill. Conch., 1858, pl. VIII, figs. 12, 12*a*, 12*b*; *Man., 1859, II, p. 138, fig. 664.

Ohio River drainage; western New York to southern Michigan; Iowa; eastern Nebraska to Indian Territory.

(Group of *Truncilla brevidens.*)

Shell somewhat quadrate, not sharply truncate behind; post-basal swelling of female in front of post-basal point and rounded below.

† **TRUNCILLA BREVIDENS** Lea.

Unio brevidens LEA, Trans. Am. Phil. Soc., IV, 1834, p. 75, pl. IV, fig. 6; *Obs. I, 1834, p. 85, pl. VI, fig. 6.—*HANLEY, Test. Moll., 1842, p. 198; *Biv. Shells, 1843, p. 198, pl. XX, fig. 41.—*CATLOW and REEVE, Conch. Nom., 1845, p. 56.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—*CHENU. Ill., Conch., 1858, pl. VIII, figs, 6, 6*a*, 6*b*.—*PÆTEL, Conch. Sam., III, 1890, p. 146.

**Margarita (Unio) brevidens* LEA, Syn., 1836, p. 29; 1838, p. 21.

**Margaron (Unio) brevidens* LEA, Syn., 1852, p. 32; 1870, p. 50.

[1]A † placed before a species indicates that the type, or what are believed to be authentic specimens have been examined by the writer.

[2]An * in front of a reference indicates that it has been verified.

**Unio interruptus* CONRAD, New F. W. Shells, 1834, p. 69.—* SAY, Am. Conch., VI, 1834.—* CONRAD, Monog., X, 1838, p. 88, pl. XLVIII; *Pr. Ac. N. Sci., Phila., VI, 1853, p. 250.—* KUSTER, Conch. Cab. Unio, 1861, p. 182, pl. LVII, fig. 3; pl. LX, fig. 2.—* REEVE, Conch. Icon., XVI, 1864, pl. XIV, fig. 56.

**Truncilla interrupta* AGASSIZ, Arch. für Naturg., I, 1852, p. 44.

Tennessee drainage.

†TRUNCILLA PENITA Conrad.

**Unio penitus* CONRAD, New F.W. Shells, 1834, pp. 33, 70, pl. V, fig. 1.—* FERUSSAC, Guer. Mag., 1835, p. 29.—* MÖLLER, Syn. Nov. Gen., 1836, p. 203.—* HANLEY, Test. Moll., 1842, p. 183; * Biv. Shells, 1843, p. 183.—* CATLOW and REEVE, Conch. Nom., 1845, p. 62.—* CHENU, Bib. Conch., 1st ser., III, 1845, p. 18, pl. III, fig. 9.—* CONRAD, Pr. Ac. N. Sci., Phila., VI, 1853, p. 254.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* REEVE, Conch. Icon., XVI, 1864, pl. XIV, fig. 55.—* P.ETEL, Conch. Sam., III, 1890, p. 162.

**Margarita* (*Unio*) *penitus* LEA, Syn., 1836, p. 19; 1838, p. 16.

**Margaron* (*Unio*) *penitus* LEA, Syn., 1852, p. 24; 1870, p. 36.

**Unio compactus* LEA, Proc. Ac. N. Sci. Phila., III, 1859, p. 154; *Jl. Ac. N. Sci. Phila., IV, 1859, p. 218, pl. XXVIII, fig. 98; *Obs. VII, 1859, p. 36, pl. XXVIII, fig. 98.

**Margaron* (*Unio*) *compactus* LEA, Syn., 1870, p. 36.

Alabama and Tombigbee river drainage.

†TRUNCILLA MODICELLA Lea.

**Unio modicellus* LEA, Pr. Ac. Phila., III, 1859, p. 171; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 347, pl. LVII, fig. 172; *Obs., VIII, 1860, p. 29, pl. LVII, fig. 172.—* B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *modicellus*[1] LEA, Syn., 1870, p. 41.

Connasaugua and Chattanooga rivers, northwest Georgia.

The following species[2] are unfigured and indeterminate:

Truncilla (*Unio*) *perplexus* Rafinesque.
Truncilla granulatus Rafinesque.
Unio (*Truncilla*) *metaplata* Rafinesque.

†TRUNCILLA LENIOR Lea.

**Unio lenis* LEA, Pr. Am. Phil. Soc., I, 1840, p. 286.[3]

**Unio lenior* LEA., Tr. Am. Phil. Soc., VIII, 1843, p. 204, pl. XII, fig. 18; *Obs., III, 1842, p. 42, pl. XII, fig. 18.—*CONRAD, Pr. Acad. N. Sci. Phila., VI, 1853, p. 251.—*CHENU, Ill. Conch., 1858, pl. XXVII, figs. 4, 4*a*, 4*b*.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—*REEVE, Conch. Icon., XVI, 1864, pl. XVII, fig. 75.—*P.ETEL, Conch. Sam., III, 1890, p. 157.

**Margaron* (*Unio*) *lenior* LEA, Syn., 1852, p. 39; 1870, p. 62.

Stone River, Tennessee; near Woodville, Alabama.

[1] Four specimens of this species are in the U. S. National Museum collection, from the Connasauga River, Georgia, three of which are males, with a form something like that of *T. penita*; the fourth is a young female, which distinctly shows a radiately ridged post-basal swelling.

[2] These are in continuation of Monography, 1831, p. 4.

[3] Lea changed his name *lenis* to *lenior*, probably because Conrad had previously used the former for a species of *Unio*, which is no doubt a young *rentricosus*.

†TRUNCILLA METASTRIATA Conrad.

* *Unio metastriatus* CONRAD, Mon., XII, 1840, p. 104, pl. LVII, fig. 2.

Black Warrior River and Woodville, Alabama.

(Group of *Truncilla arcæformis.*)

Shell greatly inflated, with a sharp posterior ridge, and two lesser ridges above it; inflation of the female flattened on its base.

†TRUNCILLA ARCÆFORMIS Lea.

* *Unio arcæformis* LEA, Tr. Am. Phil. Soc., IV, 1831, p. 116, pl. XVII, fig. 44; *Obs., I, 1834, p. 126, pl. XVII, fig. 44.—*ANTON, Verz. der Conch., 1839, p. 14.[1]—DESHAYES, Tr. Element, Conch., 1839, p. 18, pl. XXIX, fig. 6.—*HANLEY, Test. Moll., 1842, p. 182; * Biv. Shells, 1843, p. 182, pl. XXII, fig. 40.—*CATLOW and REEVE, Conch. Nom., 1845, p. 55.—*DESHAYES, Traité Element., II, 1853, pl. XXIV, fig 6.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—*CHENU, Ill. Conch., 1858, pl. XII, figs. 3, 3*a*, 3*b*.—*REEVE, Conch. Icon., XVI, 1864, pl. XIV, fig. 57.

* *Margarita* (*Unio*) *arcæformis* LEA, Syn., 1836, p. 18; 1838, p. 16.

Margaron (*Unio*) *arcæformis* LEA, Syn., 1852, p. 23; 1870, p. 36.

* *Truncilla arcæformis* AGASSIZ, Arch. für Naturg, I, 1852, p. 44.

Unio nexus SAY, Transylvania Jl., IV, 1831, p. 527; *SAY, Am. Conch., Pt. 6, 1834, pl. LI.[2]—*CONRAD, New F. W. Shells, 1834, p. 70.—*FERUSSAC, Guer. Mag., 1835, p. 28.—*CONRAD, Monog., VIII, 1837, p. 68, pl. XXXVIII, fig. 1.—*KUSTER, Conch. Cab. Unio, 1854, p. 69, pl. XVII, fig. 2.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 252.—*PÆTEL, Conch. Sam., III, 1890, p. 60.

Tennessee and Cumberland river systems.

Subgenus SCALENARIA (Rafinesque, 1820) Agassiz.

(Type, *Unio sulcatus* Lea.)

Male shell having a wide, radiating, shallow depression in front of the posterior ridge; that of the female having a small, rounded, well-defined, radial post-basal swelling. Animal with marsupium occupying the greater part of the outer branchiæ; mantle enlarged below; branchial opening, with few papillæ.

(Group of *Truncilla sulcata.*)

Shell elliptical, beaks high and well forward, male shell not radiately striated posteriorly.

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[1] This may be *T. triquetra.*

[2] According to Binney, *Unio nexus* was first published in December, 1831, (Bib. N. Am. Conch., I, p. 266), and Scudder states that the fourth volume of the Transactions, containing Lea's description of *Unio arcæformis*, was published at the latter end of 1831, and acknowledged by correspondents as received that year (Bib. of publications of Lea, 1885, p. 3). As I am not able to say which has precedence, I prefer retaining the well-known name of Lea rather than that of Say, which is less known.

†TRUNCILLA SULCATA Lea.

* *Unio sulcatus* LEA, Tr. Am. Phil. Soc., III, 1830, p, 430, pl. VIII, fig. 2.—*SAY, Am. Conch., No. 1, 1830, pl. V.—SHORT and EATON, Transylvania Jl., 1831, p. 75.—*LEA Obs., I, 1834, p. 44, pl. VIII, fig. 12.—*HANLEY, Test. Moll., 1842, p. 188; *Biv. Shells, 1843, p. 188.—*CHENU, Bib. Conch., 1st ser., III, 1845, p. 11, pl. I, figs. 5, 5*a*.—*CATLOW and REEVE, Conch. Nom., 1845, p. 64.—*CHENU, Ill. Conch., 1858, pl. XIII, figs. 3, 3*a*, 3*b*.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 496.—*REEVE, Conch. Icon., XVI, 1864, pl. XIV, fig. 60.—*PÆTEL, Conch. Sam., III, 1890, p. 169.

* *Margarita* (*Unio*) *sulcatus* LEA, Syn., 1836, p. 22; 1838, p. 18.

* *Margaron* (*Unio*) *sulcatus* LEA, Syn., 1852, p. 26; 1870, p. 40.

* *Unio sulcata* DESHAYES, An. sans Vert. 2d ed., VI, 1835, p. 548; 3d ed., II, 1839, p. 672.

Unio ridibundus SAY, New Harm. Diss., II, 1829, p. 308; *Am. Conch., I, 1830, pl. V.—SHORT and EATON, Transylvania Jl., 1831, p. 75.—*CONRAD, New F. W. Shells, 1834, p. 71.—*CHENU, Bib. Conch., 1st ser., III, 1845, p. 11, pl. I, fig. 6.—*KUSTER, Conch. Cab. Unio, 1862, p. 276, pl. XCIII, fig. 2.—*REEVE, Conch. Icon., XVI, 1864, pl XV, fig. 63.

* *Unio obliquatus* SAY, Am. Conch., VI, 1834.—*CONRAD, New F. W. Shells, 1834, p. 70.—*KUSTER, Conch. Cab., 1862, p. 274, pl. XCII, fig. 3.—*AGASSIZ, Arch. für Naturg., I, 1852, p. 43.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 253.

* *Unio gibbosus* var. *perobliquus* CONRAD, Monog., VI, 1836, p. 50, pl. XXVII, fig. 2.

Unio perobliquus CONRAD, Cover of Monog., VIII, 1837.

* *Unio pectitus* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 255; Jl. Ac. N. Sci. Phila., 1854, p. 297, pl. XXVII, fig. 4.

TRUNCILLA SULCATA var. DELICATA Simpson.[1]

Ohio River drainage; the variety in the Detroit River and southern Michigan.

(Group of *Truncilla haysiana*.)

Shell shining, round-oval; posterior part of both male and female distinctly radially sculptured.

†TRUNCILLA HAYSIANA Lea.

* *Unio haysianus* LEA, Tr. Am. Phil. Soc., V, 1833, p. 35, pl. III, fig. 7; *Obs., I, 1834, p. 147, pl. III, fig. 7.—*HANLEY, Test. Moll., 1842, p. 188; *Biv. Shells, 1843, p. 188.—*CATLOW and REEVE, Conch. Nom., 1845, p. 59.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 250.—*KUSTER, Conch. Cab. Unio, 1856, p. 209, pl. LXIX, fig. 4.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—*REEVE, Conch. Icon., XVI, 1864, pl. XV, fig. 62.—*PÆTEL, Conch. Sam., III, 1890, p. 154.

* *Margarita* (*Unio*) *haysianus* LEA, Syn. 1836, p. 22; 1838, p. 18.

* *Margaron* (*Unio*) *haysianus* LEA, Syn. 1852, p. 26; 1870, p. 41.

* *Scalenaria haysiana* AGASSIZ, Arch. für Naturg. I, 1852, p. 48.

* *Unio sowerbyanus* LEA, Tr. Am. Phil. Soc., V, 1839, p. 68, pl. X, fig. 28;[2] *Obs. I, 1834, p. 180, pl. X, fig. 28.—*FERUSSAC, Guer. Mag., 1835, p. 29.—*CONRAD,

[1] Mr. Bryant Walker has sent me specimens of a form which I refer to this species that are smaller and in every way more delicate. I propose the above varietal name for it.

[2] Male of *T. haysiana*. *Unio haysianus* and *U. sowerbyanus* were published in the same paper, the former having precedence.

Monog., VIII, 1837, p. 66, pl. XXXVII, fig. 1.—* HANLEY, Test. Moll., 1842, p. 185; *Biv. Shells, 1843, p. 185.—* CATLOW and REEVE, Conch. Nom., 1845, p. 64.—* KUSTER, Conch. Cab. Unio, 1852, p. 62, pl. XIV, fig. 3.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 257.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 496.—* REEVE, Conch. Icon., XVI, 1864, pl. XIV, fig. 58.—* PÆTEL, Conch. Sam., III, 1890, p. 168.

**Margarita* (*Unio*) *sowerbyanus* LEA, Syn. 1836, p. 20; 1838, p. 17.

**Margaron* (*Unio*) *sowerbyanus* LEA, Syn. 1852, p. 25; 1870, p. 38.

Tennessee and Cumberland river systems.

†TRUNCILLA OTHCALOOGENSIS Lea.

**Unio othcaloogensis* LEA, Proc. Acad. N. Sci. Phila., IX, 1857, p. 32;[1] Jl. Ac. N. Sci. Phila., IV, 1858, p. 74, pl. XIV, fig. 51; Obs. VI, 1858, p. 75, pl. XIV, fig. 54.

**Margaron* (*Unio*) *othcaloogensis* LEA, Syn. 1870, p. 38.

Othcalooga Creek, Gordon County, Georgia.

Subgenus DYSNOMIA Agassiz. 1852.

(Type, *Unio foliatus* Hildreth.)

Shell of the male with a posterior and central radiating ridge, with a wide, flattened space between; that of the female with a greatly produced inflation, which is but little behind the center of the base, it being a continuation of the central ridge. Animal with mantle beautifully maculate on its border; female animal unknown.

†TRUNCILLA FOLIATA Hildreth.

**Unio foliatus* HILDRETH, Am. Jl. Sci., XIV, 1828, p. 284, fig. 16.—* CONRAD, New F. W. Shells, 1834, p. 69.—* FERUSSAC, Guer. Mag., 1835, p. 27.—* HANLEY, Test. Moll., 1842, p. 176; *Biv. Shells, 1843, p. 176.—* CATLOW and REEVE, Conch. Nom., 1845, p. 59.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* CHENU, Man., 1859, II, p. 143, fig. 705.—* HARPER, L. and F. W. Shells of Cinti., p. 4.

**Margarita* (*Unio*) *foliatus* LEA, Syn. 1836, p. 13; 1838, p. 14.

**Margaron* (*Unio*) *foliatus* LEA, Syn. 1852, p. 20; 1870, p. 30.

**Unio flexuosus* CONRAD, Monog. I, 1835, p. 8, pl. IV, fig. 2.—* KUSTER, Conch. Cab. Unio, 1852, pp. 46, 211, pl. IX, fig. 2; LXX, fig. 1.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 249.—* REEVE, Conch. Icon., XVI, 1864, pl. VI, fig. 22; XIII, fig. 53.

**Dysnomia flexuosa* AGASSIZ, Arch. für Naturg. I, 1852, p. 43.

Ohio River drainage.

†TRUNCILLA STEWARDSONI Lea.

**Unio stewardsoni* LEA, Tr. Am. Phil. Soc., X, 1852, p. 278, pl. XXIII, fig. 36; * Obs. V, 1852, p. 34, pl. XXIII, fig. 36.—* CONRAD, Pr. Acad. Nat. Sci. Phila., VI, 1853, p. 258.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 498.—* REEVE, Conch. Icon., XVI, 1864, pl. XV, fig. 66.—* PÆTEL, Conch. Sam., III, 1890, p. 168.

**Margaron* (*Unio*) *stewardsoni* LEA, Syn. 1852, p. 20; 1870, p. 38.

Tennessee River.

[1] I have seen only the type of this species, apparently a young female, which is a reddish buff-colored, shining shell, somewhat more elongated than *T. haysiana*, but which probably groups with it.

Subgenus PILEA Simpson, 1900.

(Type, *Unio personatus* Say.)

Male shell with a wide, shallow, radiating depression in front of the posterior ridge, that of the female with a rounded, foliaceous swelling at the posterior base. Animal with post basal flap of mantle of female very heavy; ovisacs not extending to the top of the marsupium.

(Group of *Truncilla personata.*)

Shell inflated, rather solid, nearly as high as long; female not having a central depression, post basal swelling small.

† TRUNCILLA PERSONATA Say.

Unio personatus SAY, New Harm. Diss. II, No. 20, 1829, p. 309.—* FERUSSAC, Guer. Mag., 1835, p. 28.—* CONRAD, Monog. V, 1836, p. 47, pl. XXIV.—* HANLEY, Test. Moll., 1842, p. 202; * Biv. Shells, 1843, p. 202.—* CATLOW and REEVE, Conch. Nom., 1845, p. 62.—* KUSTER, Conch. Cab. Unio, 1852, p. 48, pl. X, fig. 1.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 254.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—* REEVE, Conch. Icon., XVI, 1864, pl. XV, fig. 64.—* PÆTEL, Conch. Sam., III, 1890, p. 116.

**Margarita* (*Unio*) *personatus* LEA, Syn. 1836, p. 33; 1838, p. 23.

**Margaron* (*Unio*) *personatus* LEA, Syn. 1852, p. 35; 1870, p. 38.

**Scalenaria personata* AGASSIZ, Arch. für Naturg. I, 1852, p. 43.

**Unio pileus* LEA, Trans. Am. Phil. Soc., IV, 1834, p. 119, pl. XVIII, fig. 47.—* CONRAD, New F. W. Shells, 1834, p. 71.—* LEA, Obs. I, 1834, p. 129, pl. XVIII, fig. 47.—* FERUSSAC, Guer. Mag., 1835, p. 28.—* HANLEY, Test. Moll., 1842, p. 185; * Biv. Shells, 1843, p. 185.—* CATLOW and REEVE, Conch. Nom., 1845, p. 62.—* CHENU, Ill. Conch., 1858, pl. XV, figs. 2, 2*a*, 2*b*.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* REEVE, Conch. Icon., XVI, 1864, pl. XV, fig. 64.—* PÆTEL, Conch. Sam., III, 1890, p. 163.

**Margarita* (*Unio*) *pileus* LEA, Syn. 1836, p. 20; 1838, p. 17.

**Margaron* (*Unio*) *pileus* LEA, Syn. 1852, p. 24.

**Unio capillaris* LEA, Tran. Am. Phil. Soc., V, 1834, p. 29, pl. II, fig. 2; * Obs. I, 1834, p. 141, pl. II, fig. 2.—* FERUSSAC, Guer. Mag., 1835, p. 29.

Ohio River drainage. Rare.

(Group of *Truncilla perplexa.*)

Shell of the male with median and posterior radiating ridges, both of which are usually somewhat nodose; postbasal expansion of the female rounded, large, thin, placed far back.

† TRUNCILLA PERPLEXA Lea.[1]

**Unio perplexus* LEA, Trans. Am. Phil. Soc., IV, 1831, p. 112, pl. XVII, fig. 42; * Obs. I, 1834, p. 122, pl. XVII, fig. 42.—* HANLEY, Test. Moll., 1842, p. 181; * Biv. Shells, 1843, p. 181, pl. XXII, fig. 39.—* CATLOW and REEVE, Conch. Nom., 1845, p. 62.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 496.—* CHENU, Ill. Conch., 1858, pl. XVIII, figs. 5, 5*a*, 5*b*.

**Margarita* (*Unio*) *perplexus* LEA, Syn. 1836, p. 17; 1838, p. 16.

[1] Lea's species was published, according to Scudder (Bibliography of Isaac Lea, p. 3), in the latter part of 1831. Rafinesque published a species, "*Truncilla, Unio perplexus,*" in the Continuation of a Monograph in October, 1831, which I can not identify. I do not know which name appeared first, but I think it best to retain the well-known and properly described name of Dr. Lea.

**Margaron* (*Unio*) *perplexus* LEA, Syn., 1852, p. 23; 1870, p. 34.

**Unio gibbosus* FERUSSAC, Guer. Mag., 1835, p. 27.—CONRAD, Monog. VI, 1836, p. 50, pl. XXVII, fig. 1.—REEVE, Conch. Icon., XVI, 1864, pl. XI, fig. 41, 41*a*, 41*b*.

**Dysnomia gibbosa* AGASSIZ, Arch. für Nat., I, 1852, p. 43.

**Unio gibbosus, Raf. v. perplexus* PÆTEL, Conch. Sam., III, 1890, p. 153.

**Unio torulosus* CONRAD, New F. W. Shells, 1834, p. 72; *Proc. Acad. N. Sci. Phila., VI, 1853, p. 259.

**Unio obliquus* POTIEZ and MICHAUD, Gall. Moll., 1844, p. 153, pl. LVIII, figs. 3, 4.

†TRUNCILLA PERPLEXA var. RANGIANA Lea.

**Unio rangianus* LEA, Trans. Am. Phil. Soc., VI, 1839, p. 95, pl. XVIII, fig. 56;[1] *Obs., II, 1838, p. 95, pl. XVIII, fig. 56.—*TROSCHEL, Arch. für Naturg., V, 1839, p. 237.—*HANLEY, Test. Moll., 1842, p. 187; *Biv. Shells, 1843, p. 187, pl. XXI, fig. 48.—*CATLOW and REEVE, Conch. Nom., 1845, p. 63.—*CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 256.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—*CHENU., Ill. Conch., 1858, pl. XXIV, figs. 5, 5*a*, 5*b*.—*KUSTER, Conch. Cab. Unio, 1861, p. 257, pl. LXXXVII, fig. 1; LXXXIX, fig. 1.—*REEVE, Conch. Icon., XVI, 1864, pl. XIV, fig. 54.—*PÆTEL, Conch. Sam., III, 1890, p. 164.

**Margarita* (*Unio*) *rangianus* LEA, Syn., 1838, p. 18.

**Margaron* (*Unio*) *rangianus* LEA, Syn., 1852, p. 26; 1870, p. 40.

**Unio gubernaculum* REEVE, Conch. Icon., XVI, 1865, pl. XXVIII, fig. 146.—PÆTEL, Conch. Sam., III, 1890, p. 154.

†TRUNCILLA PERPLEXA var. CINCINNATIENSIS Lea.

**Unio cincinnatiensis* LEA, Proc. Am. Phil. Soc., I, 1840, p. 285; *Tr. Am. Phil. Soc., VIII, 1842, p. 194, pl. VIII, fig. 4; *Obs., III, 1842, p. 32, pl. VIII, fig. 4.—*CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 246.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—*CHENU., Ill. Conch., 1858, pl. XXX, figs. 3, 3*a*, 3*b*.—*PÆTEL. Conch. Sam., III, 1890, p. 148.

**Margaron* (*Unio*) *cincinnatiensis* LEA, Syn., 1852, p. 22; 1870, p. 33.

**Unio phillipsii* REEVE, Conch. Icon., XVI, 1864, pl. IV, fig. 15.

Ohio River drainage; southern Michigan? The variety *rangianus* to south Michigan.

†TRUNCILLA SAMPSONII Lea.

**Unio sampsonii* LEA, Pr. Ac. N. Sci. Phila., VI, 1861, p. 392; *Jl. Ac. N. Sci. Phila., V, 1862, p. 192, pl. XXV, fig. 261; *Obs., IX, 1863, p. 14, pl. XXV, fig. 261; Syn., 1870, p. 40.

Wabash River; Tennessee?

†TRUNCILLA PROPINQUA Lea.

**Unio propinquus* LEA, Pr. Ac. N. Sci. Phila., I, 1857, p. 83; *Jl. Ac. N. Sci. Phila., V, 1862, p. 63, pl. V, fig. 212; *Obs., VIII, 1862, p. 67, pl. V, fig. 212.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXXIX, fig. 417.—*PÆTEL, Conch. Sam., III, 1890, p. 164.

**Margaron* (*Unio.*) *propinquus* LEA, Syn., 1870, p. 34.

Tennessee and Cumberland river drainage.

[1] Dr. Lea claims that the animal of this form is lighter colored than that of *perplexus*, and quotes Mr. Clark, of Cincinnati, who states that this is known there as the White Mouth. The shells seem to absolutely blend together, and I have observed a wide range of color in the animals of a number of species of the genus.

†TRUNCILLA BIEMARGINATA Lea.

* *Unio biemarginatus* LEA, Pr. Ac. N. Sci. Phila., I, 1857, p. 83; *Jl. Ac. N. Sci. Phila., VI, 1866, p. 47, pl. XVI, fig. 45; * Obs., XI, 1867, p. 51, pl. XVI, fig. 45.

* *Margaron* (*Unio*) *biemarginatus* Lea, Syn., 1870, p. 38.

Tennessee River drainage.

†TRUNCILLA CAPSÆFORMIS Lea.

* *Unio capsæformis* LEA, Tr. Am. Phil. Soc., VI, 1834, p. 31, pl. II, fig. 4; * Obs., I, p. 143, pl. II, fig. 4.—* CONRAD, Monog., VIII, 1837, p. 72, pl. XL, fig. 2.—* FERUSSAC, Guer. Mag., 1839, p. 29.—* HANLEY, Test. Moll., 1842, p. 191, *Biv. Shells, 1843, p. 19, pl. XXI, fig. 5.—* CATLOW and REEVE, Conch. Nom., 1845, p. 57.—* KUSTER, Conch. Cab. Unio, 1852, p. 42, pl. VIII, fig. 5.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 246.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* REEVE, Conch. Icon., XVI, 1864, pl. XVII, figs. 79, 79*a*, 79*b*.—* PÆTEL, Conch. Sam., III, 190, p. 147.

* *Margarita* (*Unio*) *capsæformis* LEA, Syn., 1836, p. 24; 1838, p. 19.

* *Margaron* (*Unio*) *capsæformis* LEA, Syn., 1852, p. 27; 1870, p. 42.

Tennessee River drainage.

†TRUNCILLA FLORENTINA Lea.

* *Unio florentinus* LEA, Pr. Ac. N. Sci. Phila., VII, 1857, p. 83; *Jl. Ac. N. Sci. Phila., V, 1862, p. 61, pl. V, fig. 213; * Obs., VIII, 1862, p. 68, pl. V, fig. 213.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *florentinus* LEA, Syn., 1870, p. 42.

* *Unio turgidulus* LEA, Pr. Ac. N. Sci. Phila., II, 1858, p. 40; *Jl. Ac. N. Sci. Phila., V, 1862, p. 62, pl. V, fig. 211; * Obs., VIII, 1862, p. 66, pl. V, fig. 211.—* REEVE, Conch. Icon., XVI, 1864, pl. XVII, fig. 80.—* PÆTEL, Conch. Sam., III, 1890, p. 170.

* *Margaron* (*Unio*) *turgidulus* LEA, Syn., 1870, p. 42.

* *Unio nux* KUSTER, Conch. Cab. Unio, 1861, p. 218, pl. LXXIII, fig. 2.

* *Unio sacculus* REEVE, Conch. Icon., XVI, 1864, pl. XV, fig. 67.—* ANTHONY, Am. Jl. Conch., I, 1865, p. 157, pl. XII, fig. 3.

* *Unio saccatus* KUSTER, Conch. Cab., 1861, p. 263, pl. LXXXIX, fig. 2.—* PÆTEL, Conch. Sam., III, 1890, p. 166.

Tennessee River drainage; Cumberland River.

†TRUNCILLA DEVIATA Reeve.

* *Unio deviatus*[1] REEVE, Conch. Icon., XVI, 1864, pl. XV, fig. 61.—*ANTHONY, Am. Jl. Conch., I, 1865, p. 156, pl. XII, fig. 2.—* B. H. WRIGHT, Check List, 1888.—PÆTEL, Conch. Sam., III, 1890, p. 150.

* *Margaron* (*Unio*) *deviatus* LEA, Syn., 1870, p. 42.

Cumberland and Tennessee rivers.

Genus MICROMYA (Agassiz, 1852) Simpson.

(Type, *Unio fabalis* Lea.)

Micromya AGASSIZ, Arch. für Nat., 1852, p. 57.

Shell triangular oval, solid, dark, feebly rayed with undulating lines; beak sculpture almost wanting, consisting of a few feeble, doubly-looped

[1] Reeve credits this name to Anthony's manuscript in Museum Cuming.

ridges; hinge teeth heavy, laterals club-shaped and truncated posteriorly; post-basal swelling of the female distinct and often rather abrupt, sometimes somewhat irregularly radially ridged, the shell of this part being rather thin.

Animal with mantle fringed below, maculate on the border, which is greatly thickened at the post-basal part in the female and developed into a flap, with a distinct, toothed ridge inside; marsupium occupying the posterior part of the outer branchiæ in numerous distinctly marked ovisacs; inner gills free from abdominal sac in part.

(Group of *Micromya fabalis.*)

Shell small, with faint undulate rays, inflated area of female scarcely radiately striated.

† MICROMYA FABALIS Lea.

* *Unio fabalis*,[1] LEA, Tr. Am. Phil. Soc., IV, 1831, p. 86, pl. X, fig. 6; *Obs., I, 1834, p. 96, pl. X, fig. 16.—* FERUSSAC, Guer. Mag., 1835, p. 27.—* HANLEY, Test. Moll., 1842, p. 196; * Biv. Shells, 1843, p. 196.—* CATLOW and REEVE, Conch. Nom., 1845, p. 59; * H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* CHENU, Ill. Conch., 1858, pl. VIII, figs. 1, 1*a*, 1*b*.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXVI, fig. 196.

* *Margarita* (*Unio*) *fabalis* LEA, Syn., 1836, p. 28; 1838, p. 20.

* *Margaron* (*Unio*) *fabalis* LEA, Syn., 1852, p. 31; 1870, p. 49.

Unio capillus SAY, Transylvania Journ., IV, 1831, p. 528.

* *Unio lapillus* SAY, Am. Conch., V, 1832, pl. XLI; VI, 1834, No. 49.—*CONRAD, New, F. W. Shells, 1834, p. 70.; * Monog., VI, 1836, p. 54, pl. XXIX, fig. 12.—* CHENU, Bib. Conch., 1st ser. III, 1845, p. 52, pl. XIV, figs. 1, 1*a*, 1*b*.—* KUSTER, Conch. Cab., 1848, p. 53, pl. XI, fig. 3.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 251.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 156.

Ohio River drainage; Rouge River, near Detroit, Michigan; New York.

(Group of *Micromya cælata.*)

Shell triangular ovate, with a low, rounded posterior ridge; male and female shells distinctly wrinkled behind.

† MICROMYA CÆLATA Conrad.

* *Unio cælatus* CONRAD, Am. Jl. Sci. and Arts, XXV, 1834, p. 338, pl. I, fig. 1; New, F. W. Shells, 1834, p. 29, pl. III, fig. 4, p. 68.—* FERUSSAC, Guer. Mag., 1835, p. 29.—* MÖLLER, Syn. Nov. Gen., 1836, p. 199.—* HANLEY, Test. Moll., 1842, p. 175; * Biv. Shells, 1843, p. 175.—* CHENU, Bib. Conch., 1st ser., III, 1845, p. 16, pl. III, fig. 3.—* CATLOW and REEVE, Conch. Nom., 1845, p. 56.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* REEVE, Conch.

[1] According to Scudder the volume of the Transactions containing this species appeared in the latter part of 1831, and was acknowedged by correspondents as received that year. Say published his *U. capillus* in the Transylvania Journal for December, 1831, and in the American Conchlogy changed it to *lapillus*. It is probable that Lea's name was published first.

Icon., XVI, 164, pl. II, fig. 7.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 147.

* *Margarita* (*Unio*) *cælatus* LEA, Syn., 1836, p. 12; 1838, p. 14.

* *Margaron* (*Unio*) *cælatus* LEA, Syn., 1852, p. 20; 1870, p. 20.

Tennessee River drainage; cited from Michigan by Sager and Miles, certainly in error. They might have mistaken for this a rather high specimen of *fabalis*.

Genus LAMPSILIS Rafinesque, 1820.

(Type, *Unio ovatus* Say.)

Lampsilis RAFINESQUE, Ann. Gen. Sci. Phys. Brux., 1820, p. 298.

Shell oval to elliptical, smooth or slightly concentrically sculptured, usually without a posterior ridge; epidermis generally smooth and shining, often brilliantly rayed; beak sculpture, for the most part, consisting of fine, parallel ridges, which show a tendency to fall into an anterior and posterior loop; hinge with one or two pseudocardinals and one lateral in the right valve, and two pseudocardinals and two laterals in the left; female shell having a moderate and gradual inflation in the post-ventral region opposite the marsupium. Animal with the inner gills usually attached nearly or quite their entire length to the abdominal sac; marsupium occupying the hinder part of the outer gills; ovisacs distinct, separated by sulci, rounded below, having a fold near their bases, the whole projecting below the inner gills; mantle edge double and thickened, often swollen behind into a sort of flap in the female.

Section LAMPSILIS Rafinesque.

(Type, *Unio ovatus* Say.)

Shell inflated, rather thin, shining, sometimes having a posterior ridge; beak sculpture coarse, consisting of a few, more or less, parallel ridges, which scarcely fall into loops. Animal having the mantle of the female usually toothed and thickened on the post-basal portion, which develops into a large, curious flap when the gills are filled with ova.

† LAMPSILIS VENTRICOSUS Barnes.

* *Unio ventricosus* BARNES, Am. Jl. Sci., VI, 1823, p. 267, pl. XIII, fig. 14 (outline).—* SAY, Am. Conch., No. IV, 1832, pl. XXXII.—* FERUSSAC, Guer. Mag., 1835, p. 26.—* C. B. ADAMS, Thompson's History of Vermont, 1842, p. 167; F. W. and L. S. of Vermont, 1842, p. 17.—* HANLEY, Test. Moll., 1842, p. 189; * Biv. Shells, 1843, p. 189, pl. XXIV, fig. 8.—* DE KAY, Zool. of N. Y., Pt. 6, 1843, p. 190.—* CHENU, Bib. Conch., 1st ser. III, 1845, p. 45, pl. XII, figs. 1, 2.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, pp. 492, 495.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XLIII, fig. 235.—* B. H. WRIGHT, Check List, 1888.

* *Mya ventricosus* EATON, Zool. Text-Book, 1826, p. 221.

* *Margarita* (*Unio*) *ventricosus* LEA, Syn., 1836, p. 23; 1838, p. 18.

* *Margaron* (*Unio*) *ventricosus* LEA, Syn., 1852, p. 26; 1870, p. 41.

* *Lampsilis ventricosus* BAKER, Moll. Chicago, Pt. 1, 1898, p. 94, pl. XII, figs. 3–5.—* SMITH, Bull. U. S. Fish Com., 1899, p. 291, pl. LXXXIII.

* *Lampsilis ventricosa* STIMPSON, Shells of N. Eng., 1851, p. 14.

* *Unio radiatus* HILDRETH, Am. Jl. Sci., XIV, 1828, p. 286.

Unio occidens LEA, Tr. Am. Phil. Soc., III, 1829, p. 435, pl. X, fig. 16.—SHORT and EATON, Transylvania Jl., 1831, p. 78.—* LEA, Obs., I, 1834, p. 49, pl. X, fig. 16.—* HANLEY, Test. Moll., 1842, p. 189; * Biv. Shells, 1843, p. 189.—* CATLOW and REEVE, Conch. Nom., 1845, p. 62.—* KUSTER, Conch. Cab. Unio, 1856, p. 170, pl. LI, figs. 1, 2.—* CHENU, Ill. Conch., 1858, pl. XII, figs. 5, 5*a*, 5*b*.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* CALKINS, Pr. Ottawa Acad. Sci., 1874, p. 44.—* LATCHFORD, Tr. Ottawa Field. Nat. Club, 1882, p. 51.—* B. H. WRIGHT, Check List, 1888.

* *Margarita* (*Unio*) *occidens* LEA, Syn., 1836, p. 23; 1838, p. 18.

* *Margaron* (*Unio*) *occidens* LEA, Syn., 1852, p. 26; 1870, p. 41.[1]

* *Unio suboratus* LEA, Tr. Am. Phil. Soc., IV, 1831, p. 118, pl. XVIII, fig. 46;[2] * Obs., I, 1834, p. 128, pl. XVIII, fig. 46.—* HANLEY, Test. Moll., 1842, p. 184; * Biv. Shells, 1843, p. 184, pl. XXII, fig. 43.—* CATLOW and REEVE, Conch. Nom., 1845, p. 64.—* CHENU, Ill. Conch., 1858, pl. XII, figs. 6, 6*a*, 6*b*.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 496.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXI, fig. 163; 1868, pl. LXXXV, fig. 456.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 168.

* *Margarita* (*Unio*) *suboratus* LEA, Syn., 1836, p. 19; 1838, p. 17.

* *Margaron* (*Unio*)*suboratus* LEA, Syn., 1852, p. 24; 1870, p. 37.

* *Unio cardium* CONRAD, New F. W. Shells, 1834, p. 68.[3]—SAY. Am. Conch., VI, 1834.—CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 246.—KUSTER, Conch. Cab. Unio, 1856, p. 169, pl. L, figs. 1–4.

* *Unio cardium* Raf. v. *occidens* PÆTEL, Conch. Sam., III, 1890, p. 174.

* *Unio cardium* Raf. v. *ventricosus* PÆTEL, Conch. Sam., III, 1890, p. 147.

* *Unio fasciolus*, FERUSSAC, Guer. Mag. 1835, p. 26.

* *Unio orata*, DESHAYES, An. sans. Vert., 3d ed. 1839, p. 669.

* *Unio oratus* KUSTER, Conch. Cab. Unio, 1852, p. 55, pl. XII, fig. 1.

* *Unio lenis* CONRAD, Monog., XII, 1840, p. 106, pl. LVIII, fig. 2.[4]

* *Unio canadensis* LEA, Proc. Acad. N. Sci. Phila., I, 1857, p. 85;[5] * Jl. Ac. Nat. Sci. Phila., IV, 1860, p. 268, pl. XLIV, fig. 148; * Obs., VII, 1860, p. 86, pl. XLIV, fig. 148.—B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *canadensis* LEA, Syn., 1870, p. 37.

* *Unio dolabræformis* SOWERBY, Conch. Icon., XVI, 1867, pl. LIX, p. 298.

* *Unio latissimus* SOWERBY?, Conch. Icon., XVI, 1868, pl. LXVI, fig. 337.

†LAMPSILIS VENTRICOSUS var. SATUR Lea.

* *Unio satur* LEA, Pr. Am. Phil. Soc., V., 1852, p. 252;[6] Tr. Am. Phil. Soc., X, 1852, p. 205, pl. XVII, fig. 19; *Obs., V, 1852, p. 21, pl. XVII, fig. 19.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 257.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857,

[1] Lea says this is so close to *U. ventricosus* that it would be well to unite them. Foot note in Synopsis, 1870, p. 41.

[2] This is, I am sure, a fine male *U. ventricosus* Barnes. Dr. Lea is inclined to this opinion in a footnote on p. 118 of the Transactions.

[3] Conrad refers this species to Rafinesque. From the latter author's figure and description of *Lampsilis cardium* it is evident that it is a member of the *ventricosus* group, but whether it is the *U. ventricosus* of Barnes, the *U. capax* of Green, or some other species, I am unable to determine. Conrad and some other authors believe it to be Barnes's species.

[4] The type in the Philadelphia Academy is a young *U. ventricosus*.

[5] The type is a diseased individual, and is probably a compressed male *ventricosus*.

[6] I believe this to be merely a rather delicate, dark-colored variety of *ventricosus*, which inhabits the southwestern part of the Mississippi drainage.

p. 496.—* CHENU, Man., 1859, II, p. 138, fig. 666.—* SOWERBY, Conch. Icon., XVI, 1868, pl. XCII, fig. 501.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 166.

* *Margaron* (*Unio*) *satur* LEA, Syn., 1852, p. 24; 1870, p. 37.

Entire Mississippi drainage; St. Lawrence system; Nelson River and tributaries; the variety *satur* in the Southwest to the Sabine River, Texas.

† LAMPSILIS EXCAVATUS Lea.

* *Unio excavatus* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 32; * Jl. Ac. N. Sci. Phila., IV, 1858, p. 71, pl. XIII, fig. 52; * Obs., VI, 1858, p. 71, pl. XIII, fig. 52.—* CHENU, Man., 1859, II, p. 138, fig. 665.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXX, VII, p. 403.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 152.

* *Margaron* (*Unio*) *excavatus* LEA, Syn., 1870, p. 37.

* *? Unio ovatus* SAY var. *ornatus* CONRAD, Monog., I, 1835, p. 4.[1]

* *Unio ornatus* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXI, fig. 162.—* B. H. WRIGHT, Check List, 1888.

Tombigbee and Alabama river drainage.

† LAMPSILIS BINOMINATUS Simpson.[2]

* *Unio lineatus* LEA, Pr. Am. Phil. Soc., I, 1840, p. 287; * Tr. Am. Phil. Soc., VIII, 1842, p. 206, pl. XII, fig. 20; * Obs., III, 1842, p. 44, pl. XII, fig. 20.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 251.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* CHENU, Ill. Conch., 1858, pl. XXVIII, figs. 1, 1*a*, 1*b*.—* KUSTER, Conch. Cab. Unio, 1862, p. 278, pl. XCIV, fig. 1.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXI, fig. 309.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 157.

* *Margaron* (*Unio*) *lineatus* LEA, Syn., 1852, p. 27; 1870, p. 41.

Chattahoochee and Flint rivers, Georgia.

† LAMPSILIS CARIOSUS Say.

Unio cariosus SAY, Nich. Encyc., II, 1816, pl. III, fig. 2.[3]—SHORT and EATON Transylvania Jl. 1831, p. 70.—* SAY, Am. Conch., VI, 1834.—* CONRAD, New F. W. Shells, 1834, p. 68.—* FERUSSAC, Guer. Mag., 1835, p. 26.—* CONRAD, Monog. IV, 1836. p. 40, pl. XIX.—* GOULD, Inv. of Mass., 1841, p. 111, fig. 72.—* BINNEY, Inv. of Mass., 1870, p. 172, fig. 475.—* REEVE, Conch. Syst., I, 1841, p. 119, pl. LXXXIX, fig. 10.—* HANLEY, Test. Moll., 1842, p. 190.—* DE KAY, Zool. of N. Y., Pt. 5, 1843, p. 193, pl. XXI, figs. 243, 244.[4]—* HANLEY, Biv. Shells, 1843, p. 190, pl. XX, fig. 22.—* CATLOW and REEVE, Conch. Nom., 1845, p. 57.—* KUSTER, Conch. Cab. Unio, 1852, p. 24, pl. I, figs. 2, 3.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1835, p. 246.—* DEWEY, Ninth Rep. N. Y. State Cab., 1856, p. 35.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* SOWERBY,

[1] It is hard to tell just what this is, as Conrad does not figure or describe it. He states that while it is probably *excavatus* it is not certainly so, and he does not think it wise to displace Lea's properly described and figured species for it.

[2] Lea's name was preoccupied by Valenciennes (Encyc. Meth., II, 1827, p. 151, pl. CCXLVIII, fig. 5) for what is probably *U. radiatus*. I change it to *binominatus*.

[3] The first edition of Nicholson's Encyclopedia is dated 1816, fide W. G. Binney, Bib. N. Am. Conch., I, 1863, p. 25, and by Lea, Synopsis, 4th ed., pp. 154, 159.

[4] The figures are very probably taken from *U. ventricosus*.

Conch. Icon., XVI, 1867, pl. LVIII, fig. 294.—* HARTMAN and MICHENER, Conch. Cest., 1874, p. 38, fig. 183.—* LATCHFORD, Tr. Ottawa Field Nat. Club, 1882, p. 51.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 147.—* SIMPSON, Nautilus VIII, 1895, p. 122, 2 figures.[1]

* *Margarita* (*Unio*) *cariosus* LEA, Syn., 1836, p. 23; 1838, p. 18.

Margaron (*Unio*) *cariosus* LEA, Syn., 1852, p. 27; 1870, p. 42.

* *Unio cariosa* LAMARCK, An. sans Vert., VI, 1819, p. 80.—* DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 545; 3d ed., II, 1839, p. 671.

* *Mya cariosa* EATON, Zool. Text Book, 1826, p. 218.

* *Lampsilis cariosa* SIMPSON, Shells of N. Eng., 1851, p. 14.

* *Unio ovatus* var. b. LAMARCK, An. sans Vert., VI, 1819, p. 75.

* *Unio ovata* VALENCIENNES, Rec. Obs. Zool. Anat., II, 1833, p. 226, pl. L, figs. 1, 1*a*, 1*b*, 1*c*.

* *Unio viridis* FERUSSAC, Guer. Mag., 1835, p. 27.

* *Unio oratus* CONRAD, Ann. and Mag. Nat. Hist., IV, 1849, p. 301; * Pr. Ac. N. Sci. Phila., IV, 1849, p. 153; * Jl. Ac. N. Sci. Phila., 1850, p. 276, pl. XXXVII; fig. 6; Pr. Ac. N. Sci. Phila., VI, 1853, p. 254.

Atlantic drainage from Georgia to the lower St. Lawrence.[2]

† LAMPSILIS ALTILIS Conrad.

* *Unio altilis* CONRAD, New F. W. Shells, 1834, p. 43, pl. II, fig. 1, and p. 68.—* FERUSSAC, Guer. Mag., 1835, p. 29.—* MÖLLER, Syn. Nov. Gen., 1836, p. 207.—* HANLEY, Test. Moll., 1842, p. 190; Biv. Shells, 1843, p. 190.—* CATLOW and REEVE, Conch. Nom., 1845, p. 55.—* CHENU, Bib. Conch., 1st ser., III, 1845, p. 21, pl. I, fig. 1.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 244.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 144.

Margarita (*Unio*) *altilis* LEA, Syn., 1836, p. 24; 1838, p. 19.

* *Margaron* (*Unio*) *altilis* LEA., Syn., 1852, p. 27; 1870, p. 42.

Alabama River drainage; Little Red River, Clinton, Arkansas?

† LAMPSILIS DOLABRÆFORMIS Lea.

* *Unio dolabræformis* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 103, pl. XXIV, fig. 113; * Obs., II, 1838, p. 103, pl. XXIV, fig. 113.—* TROSCHEL, Arch. für Naturg., V, 1839, II, p. 237.—* HANLEY, Test. Moll., 1842, p. 189; * Biv. Shells., 1843, p. 189, pl. XXI, fig. 47.—* CATLOW and REEVE, Conch. Nom., 1845, p. 58.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 248.—* CHENU, Ill. Conch., 1858, pl. XXIII, figs. 6, 6*a*, 6*b*.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* KUSTER, Conch. Cab., 1861, p. 170, pl. LII, figs. 1, 2.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 151.

* *Margarita* (*Unio*) *dolabræformis* LEA, Syn., 1838, p. 18.

* *Margaron* (*Unio*) *dolabræformis* LEA, Syn., 1852, p. 27; 1870, p. 41.

Savannah, Ogeechee, and Altamaha rivers, Georgia.

† LAMPSILIS CAPAX Green.

* *Unio capax* GREEN, Cab. Nat. Hist., II, 1832, p. 290.—* CONRAD, New F. W. Shells, 1834, p. 68.—* FERUSSAC, Guer. Mag., 1835, p. 26.—* CONRAD, Monog., IX, 1837, p. 75, pl. XLII.—* KUSTER, Conch. Cab. Unio, 1852, pp. 21, 65, pl. XV, fig. 3.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 245.—* H. and A.

[1] By an error the figures of this species and *U. ochraceus* were changed.

[2] The specimens referred to this species that are often reported from the Mississippi drainage are no doubt *L. ventricosus*.

ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* SOWERBY, Conch. Icon., XVI, 1866, pl. LII, fig. 274.—* CALKINS, Pr. Ottawa Ac. Nat. Sci., 1874, p. 41.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 147.

* *Margaron* (*Unio*) *capax* LEA, Syn., 1852, p. 27; 1870, p. 42.

* *Lampsilis capax* SMITH, Bull. U. S. Fish Com., 1899, p. 291, pl. LXXXIV.

* *Symphynota globosa* LEA, Tr. Am. Phil. Soc., V, 1832, p. 41, pl. IV, fig. 12; *Obs., I, 1834, p. 153, pl. IV, fig. 12.—* FERUSSAC, Guer. Mag., 1835, p. 25.

* *Margarita* (*Unio*) *globosa* LEA, Syn., 1836, p. 23.

* *Unio globosus* HANLEY, Test. Moll., 1842, p. 188; *Biv. Shells, 1843, p. 189.—*CATLOW and REEVE, Conch. Nom., 1845, p. 59.

* *Margarita* (*Unio*) *globosus* LEA, Syn., 1838, p. 18.

Lower Ohio River drainage; southwest to St. Francis River, Arkansas; north to eastern Iowa; Elkhorn and Blue rivers, Nebraska? (Aughey). Abundant locally.

†LAMPSILIS OVATUS Say.[1]

Unio ovatus SAY, Nich. Encyc., II, 1816, pl. II, fig. 7.—* LAMARCK, An. sans Vert., VI, 1819, p. 75.—* HILDRETH, Am. Jl. Sci., XIV, 1828, p. 287.—SHORT and EATON Trans. Jl., 1831, p. 78.—* SAY, Am. Conch., VI, 1834.—* CONRAD, New F. W. Shells, 1834, p. 70; * Monog. I, 1835, p. 4, pl. II.—* FERUSSAC, Guer. Mag., 1835, p. 26.—* HANLEY, Test. Moll., 1842, p. 184; * Biv. Shells, 1843, p. 184.—* CATLOW and REEVE, Conch. Nom., 1845, p. 62.—* KUSTER, Conch. Cab. Unio, 1852, p. 22, pl. III, fig. 2.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 254.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXI, fig. 164.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 162.

* *Margarita* (*Unio*) *ovatus* LEA, Syn., 1836, p. 19; 1838, p. 17.

* *Margaron* (*Unio*) *ovatus*, LEA, Syn., 1852, p. 24; 1870, p. 37.

* *Unio ovata* LAMARCK, An. sans Vert., VI, 1819, p. 75.—* STARK, Nat. Hist., II, 1828, p. 90.—?* VALENCIENNES, Coq. Marines, Biv., 1833, pl. L, figs. 1, 1*a*, 1*b*, 1*c*.—* DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 538; 3d ed., II, 1839, p. 669.

* *Lampsilis ovata* RAFINESQUE, Ann. Gen. Sci. Phys. Brux., V, 1820, p. 298.

* *Mya ovata* EATON, Zool. Text Book, 1826, p. 218.

* *Æglia ovata* SWAINSON, Treat. on, Mal., 1840, p. 266, fig. 49.

Ohio River drainage.

†LAMPSILIS OCHRACEUS Say.

Unio ochraceus SAY, Nich. Encyc., 1816, pl. II, fig. 8.—* CONRAD, New F. W. Shells, 1834, p. 70.—* FERUSSAC, Guer. Mag., 1835, p. 25.—* CONRAD, Monog., IV, 1836, p. 37, pl. XVIII, fig. 2.—* GOULD, Inv. Mass., 1841, p. 112, fig. 74; 1870, p. 173, fig. 476.—* HANLEY, Test. Moll., 1842, p. 190; * Biv. Shells, 1843, p. 190, pl. XX, fig. 48?—* DE KAY, Zool. of N. Y., Pt. 5, 1843, p. 193, pl. LXIX, figs. 237, 238.—* CATLOW and REEVE, Conch. Nom., 1845, p. 62.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 254.—* KUSTER, Conch. Cab. Unio, 1856, p. 163, pl. XLVII, fig. 1.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXIII, fig. 317.—* HARTMAN and MICHENER, Conch. Cest., 1874, p. 39, fig. 184.—* B. H. WRIGHT, Check List, 1888.— PÆTEL, Conch. Sam., III, 1890, p. 161.—* SIMPSON, Nautilus, VIII, 1895, p. 122, fig.[2]

* *Margaron* (*Unio*) *ochraceus* LEA, Syn., 1852, p. 27; 1870, p. 42.

* *Mya ochracea* EATON, Zool. Text Book, 1826, p. 218.

[1] The name *ovatus* was used for *Unio tumidus* Retz, by Lister, Donovan, and others, but as it was called a *Mya* and the generic name *Unio* was never used with it, Say's name can stand for this species.

[2] The figure given for this species, by an error of the printer, is a female *cariosus*.

**Symphynota ochracea* LEA, Tr. Am. Phil. Soc., III, 1830, p. 455; *Obs. I, 1834, p. 69.

**Margarita* (*Unio*) *ochracea* LEA, Syn., 1836, p. 23; 1838, p. 18.

**Lampsilis ochracea* STIMPSON, Shells of N. Eng., 1851, p. 14.

**Unio crocatus* LEA, Pr. Am. Phil. Soc., II, 1841, p. 31; *Tr. Am. Phil. Soc., VIII, 1842, p. 238, pl. XXII, fig. 52; * Obs., III, 1842, p. 76, pl. XXII, fig. 52.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 247.—* CHENU, Ill. Conch., 1858, pl. XXXIII, figs. 1, 1*a*, 1*b*.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 149.

**Margaron* (*Unio*) *crocatus* LEA, Syn., 1852, p. 27; 1870, p. 42.

**Unio rosaceus* CONRAD, Pr. Acad. N. Sci., Phila., IV, 1849, p. 153; *Ann. and Mag. Nat. Hist., IV, 1849, p. 303; *Jl. Acad. N. Sci., Phila., I, 1850, p. 275, pl. XXXVII, fig. 5.

**Unio troostensis* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXVIII, fig. 210.

* *Unio affinis* SOWERBY? Conch. Icon., XVI, 1868, pl. LXIII, fig. 318.

Atlantic drainage, from New England to the Ogeechee River, Georgia.

†LAMPSILIS SPLENDIDUS Lea.

**Unio splendidus* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 70, pl. XIX, fig. 61; * Obs., II, 1838, p. 70, pl. XIX, fig. 61.—* TROSCHEL, Arch. für Naturg., V, 1839, Pt. 2, p. 237.—* HANLEY, Test. Moll., 1842, p. 190; * Biv. Shells, 1843, p. 190.—* CATLOW and REEVE, Conch. Nom., 1845, p. 64.—* KUSTER, Conch. Cab. Unio, 1852, p. 55, pl. XII, fig. 2.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 257.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* CHENU, Ill. Conch., 1858, pl. XVII, figs. 7, 7*a*, 7*b*.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXI, fig. 161.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 168.

* *Margarita* (*Unio*) *splendidus* LEA, Syn., 1836, p. 23; 1838, p. 18.

* *Margaron* (*Unio*) *splendidus* LEA, Syn., 1852, p. 27; 1870, p. 42.

**Unio regularis* SOWERBY, Conch. Icon., XVI, 1868, pl. XXXIV, fig. 181.

Altamaha and Ogeechee rivers, Georgia.

LAMPSILIS DELUMBIS Conrad.[1]

* *Unio delumbis* CONRAD, New F. W. Shells, 1834, p. 35, pl. V, fig. 3; p. 69.—* FERUSSAC, Guerin Mag., 1835, p. 29.—* MÖLLER, Syn. Nov. Gen., 1836, p. 204.—* CHENU, Bib. Conch., 1st ser., III, 1845, p. 18, pl. II, fig. 10.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1857, p. 248.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 150.

Small streams near Cooper River, South Carolina.

†LAMPSILIS PEROVALIS Conrad.

**Unio peroralis* CONRAD, New F. W. Shells, 1834, p. 43, pl. II, fig. 2, p. 71.—* FERUSSAC, Guer. Mag., 1835, p. 29.—* MÖLLER, Syn. Nov. Gen., 1836, p. 207.—* HANLEY, Test. Moll., 1842, p. 191; * Biv. Shells, 1843, p. 191.—* CATLOW and REEVE, Conch. Nom., 1845, p. 62.—* CHENU, Bib. Conch., 1st ser., III, 1845, p. 21, pl. I, fig. 2.—* CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 254.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* KUSTER, Conch. Cab. Unio, 1861, p. 257, pl. LXXXVII, fig. 2.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 163.

* *Margarita* (*Unio*) *peroralis* LEA, Syn., 1836, p. 24; 1838, p. 19.

* *Margaron* (*Unio*) *peroralis* LEA, Syn., 1852, p. 27; 1870, p. 42.

Alabama and Black Warrior rivers.

[1] This may be a valid species, but it looks from the figure like an elongated *ochraceus*.

†LAMPSILIS PERPASTUS Lea.

**Unio perpastus* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 60; *Jl. Ac. N. Sci. Phila., V, 1862, p. 69, pl. VII, fig. 219; *Obs., VIII, 1862, p. 73, pl. VII. fig. 219.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *perpastus* LEA, Syn., 1870, p. 43.

Swamp Creek, Georgia; Coosa River, Alabama.

†LAMPSILIS CLARKIANUS Lea.

**Unio clarkianus* LEA, Pr. Am. Phil. Soc., V, 1852, p. 251; *Tr. Am. Phil. Soc., X, 1852, p. 273, pl. XXI, fig. 30; *Obs., V, 1852, p. 29, pl. XXI, fig. 30.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 246.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—*B. H. WRIGHT, Check List, 1888.—*P.ÆTEL, Conch. Sam., III, 1890, p. 148.

**Margaron* (*Unio*) *clarkianus* LEA, Syn., 1852, p. 27; 1870, p. 42.

*†*Unio spillmanii* LEA, Pr. Ac. N. Sci. Phila., XIII, 1861, p. 39; *Jl. Acad. N. Sci. Phila., V, 1862, p. 98, pl. XV, fig. 246; *Obs., VIII, 1862, p. 102, pl. XV, fig. 246.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *spillmanii* LEA, Syn., 1870, p. 42.

Williamsport, Tennessee; near Columbus, Mississippi; Cahawba and Black Warrior rivers, Alabama.

†LAMPSILIS GERHARDTII Lea.

**Unio gerhardtii* LEA, Pr. Acad. N. Sci. Phila., VI, 1862, p. 168; *Jl. Ac. N. Sci. Phila., V, 1862, p. 208, pl. XXXI, fig. 277; *Obs., IX, 1863, p. 30, pl. XXXI, fig. 277.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *gerhardtii* LEA, Syn., 1870, p. 35.

Chattanooga (river?), Georgia; Shorter, Alabama.

†LAMPSILIS MULTIRADIATUS Lea.

**Unio multiradiatus* LEA, Tr. Am. Phil. Soc., III, 1829, p. 434, pl. IX, fig. 15; *Obs. I, 1834, p. 48, pl. IX, fig. 15.—*CONRAD, N. F. W. Shells, 1834, p. 70.—*DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 549; 3d ed., II, 1839, p. 673.—*HANLEY, Test. Moll., 1842, p. 190; *Biv. Shells, 1843, p. 190, pl. XXI, fig. 10.—*CATLOW and REEVE, Conch. Nom., 1845, p. 61.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—*CHENU, Ill. Conch., 1858, pl. XII, figs. 2, 2*a*, 2*b*.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXX, fig. 506*a*.—*B. H. WRIGHT, Check List, 1888.—*P.ÆTEL, Conch. Sam., III, 1890, p. 160.

**Margarita* (*Unio*) *multiradiatus* LEA, Syn., 1836, p. 24; 1838, p. 19.

**Margaron* (*Unio*) *multiradiatus* LEA, Syn., 1852, p. 31; 1870, p. 42.

**Unio fasciolus* SAY, Am. Conch., VI, 1834.—*CONRAD, Monography, III, 1836, p. 26, pl. XI, fig. 2.—*KUSTER, Conch. Cab. Unio, 1852, p. 32, pl. V, fig. 4.

*†*Unio perradiatus* LEA, Pr. Ac. N. Sci. Phila., II, 1858, p. 40; *Jl. Ac. N. Sci. Phila., V, 1862, p. 66, pl. VI, fig. 215; Obs., VIII, 1862, p. 70, pl. VI, fig. 215.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *perradiatus* LEA, Syn., 1870, p. 37.

**Unio altilis*, REEVE, Conch. Icon., XVI, 1865, pl. XXIII, fig. 109.

**Unio perovalis* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXVIII, fig. 209.

Entire Ohio River drainage; Southern Michigan; New York? (Marshall).

†LAMPSILIS DOLIARIS Lea.

Unio doliaris LEA, Pr. Ac. N. Sci. Phila., XVII, 1865, p. 88; *Jl. Ac. N. Sci. Phila., VI, 1868, p. 260, pl. XXXII, fig. 75; *Obs., XII, 1869, p. 20, pl. XXXII, fig. 75.—*B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *doliaris* LEA, Syn., 1870, p. 42.

Alabama and Tombigbee drainage.

†LAMPSILIS BREVICULUS Call.

* *Unio breviculus* CALL, Pr. U. S. Nat. Mus., X, 1887, p. 499, pl. XXVIII; *Tr. Ac. Sci. St. Louis, VII, 1895, p. 6, pl. XVII.

†LAMPSILIS BREVICULUS var. BRITTSI Simpson.

* *Lampsilis brittsi* Simpson, Pr. Ac. N. Sci. Phila., 1900, p. 76, pl. V, figs. 1, 2.[1]

White and Current rivers, Arkansas; Texas County, Missouri.

†LAMPSILIS BIANGULATUS Lea.[2]

* *Unio biangulatus* LEA, Pr. Am. Phil. Soc., I, 1840, p. 288; *Tr. Am. Phil. Soc., VIII, 1843, p. 197, pl. IX, fig. 8; *Obs., III, 1842, p. 35, pl. IX, fig. 8.—*CONRAD, Pr. Ac. N. Sci. Phila., 1853, p. 245.—*CHENU, Ill. Conch., 1858, pl. XXX, figs. 7, 7*a*, 7*b*.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—*KUSTER, Conch. Cab. Unio, 1861, p. 189, pl. LX, fig. 1; pl. LXI, fig. 1.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXXX, fig. 421.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 146.

Margaron (*Unio*) *biangulatus* LEA Syn., 1852, p. 38, 1870, p. 61.

Tennessee drainage.

LAMPSILIS SUBVEXA Conrad.[3]

**Anodonta subvexa* CONRAD, Am. Jl. Sci., XXV, 1834, p. 341, pl. I, fig. 1; *New F. W. Shells, 1834, p. 73.—*FERUSSAC, Guer. Mag. 1835, p. 25.—*MÖLLER, Syn. Nov. Gen., 1836, p. 194.—*CONRAD, Pr. Acad. N. Sci. Phila., VI, 1853, p. 264.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 185.

[1] At the time I published the *L. brittsi* I believed it to be a valid species. Since then I have seen additional material which seems to be a connecting link between it and *L. breviculus*. I can not be certain as to the relationships of this form, which seems on the one hand to have characters belonging to the typical section of *Lampsilis* and on the other to be related to *L. spatulatus* and *L. pleasi*.

[2] The systematic position of this species is a little uncertain. In the form of the shell and the teeth it seems to belong in the *Ventricosus* group, but the texture and broken rays apparently ally it to the *Ligamentinus* group. The soft parts agree best with those of members of the former assemblage, so I place it here.

[3] I do not know what this is, nor where it belongs, but it is certainly not a true *Anodonta*. The shell, according to Conrad's figure, is rayed throughout, and looks very much like a young *U. ventricosus*. He says that it has a callus resembling an incipient tooth; that it inhabits the Black Warrior River, and that it is very rare. It is just possible that it is related to some of the so-called Margaritanas of the Southern States, such as *M. spillmani*, but I think it more likely some young form of the *Ventricosus* group in which the hinge has been injured. I place it here with the greatest hesitation.

* *Margarita* (*Anodonta*) *subvera* LEA, Syn., 1836, p. 52; 1838, p. 31.
* *Anodon subvera* CATLOW and REEVE, Conch. Nom., 1845, p. 68.
* *Margaron* (*Anodonta*) *subvera* LEA, Syn., 1852, p. 50; 1870, p. 81.

Black Warrior River, Alabama.

Section EURYNIA Rafinesque, 1820.

(Type, *Unio recta* Lamarck.)

Shell oval to oblong; beak sculpture delicate, doubly looped; mantle double edged and often toothed below; that of the female sometimes developed into a thickened flap at the post base.[1]

(Group of *Lampsilis luteolus*.)

Shell shining, generally rayed; beak sculpture often broken, with the posterior loop open behind; pseudocardinals rather small, compressed, smooth inside, and often curved slightly upward.

†LAMPSILIS LUTEOLUS Lamarck.

* *Unio luteola* LAMARCK, An. sans Vert., VI, 1819, p. 79.—* DESHAYES, An. sans Vert., 2d ed. VI, 1835, p. 544; 3d ed. II, 1839, p. 671.
* *Unio luteolus* HANLEY, Test. Moll., 1842, p. 192.—* DE KAY, Zool. of New York, Pt. 5, 1843, p. 190, pl. XX, fig. 241.—* HANLEY, Biv. Shells, 1843, p. 192, pl. XXIII, fig. 16.—* CATLOW and REEVE, Conch. Nom., 1845, p. 60.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 251.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* SOWERBY, Conch. Icon., XVI, 1867, pl. LVIII, fig. 293, 293*a*, 293*b*.—* LATCHFORD, Tr. Ottawa F. Nat. Club, 1882, p. 51.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 158.—* CALL, Tr. Acad. Sci. St. Louis, VII, 1895, p. 25, pl. III.
* *Margarita* (*Unio*) *luteolus* LEA, Syn., 1836, p. 25; 1838, p. 19.
* *Margaron* (*Unio*) *luteolus* LEA, Syn., 1852, p. 28; 1870, p. 44.
* *Lampsilis luteolus* BAKER, Moll. Chicago, Pt. 1, 1898, p. 103, pls. XI, XXXVII, fig. 12.
* *Unio inflatus* BARNES, Am. Jl. Sci., VI, 1823, p. 266.—* CONRAD, New F. W. Shells, 1834, p. 69.
* *Mya inflata* EATON, Zool. Text-Book, 1826, p. 221.
* *Unio siliquoideus* BARNES, Am. Jl. Sci., VI, 1823, p. 269, pl. XIII, fig. 150 (outline).—* FERUSSAC, Guer. Mag., 1835, p. 27.—* CONRAD, Monog., II, 1836, p. 22, pl. X, fig. 1.—* C. B. ADAMS, Thompson's Hist. of Vermont, 1842, p. 167; F. W. and L. S. of Vermont, p. 17, 1842.
* *Unio siliquoides* KUSTER, Conch. Cab. Unio, 1852, p. 30, pl. V, fig. 2.
* *Mya siliquoidea*, EATON, Zool. Text-Book, 1826, p. 221.
* *Lampsilis siliquoidea* STIMPSON, Shells of New Eng., 1851, p. 14.
* *Unio childreni* HANLEY, Biv. Shells, 1843, p. 193, pl. XXIII, fig. 57.
* *Unio hydianus* KUSTER, part, Conch. Cab. Unio, 1861, p. 201, pl. LXVII, fig. 1.[2]
* *Unio distans* ANTHONY, Am. Jl. Conch., I, 1865, p. 156, pl. XIII, fig. 2.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 151.
* *Unio multiradiatus* SOWERBY, Conch. Icon., XVI, 1868, pl. LXI, fig. 306.[3]
* *Unio affinis* SOWERBY, Conch. Icon., XVI, 1868, pl. LXI, fig. 307.

[1] Lea has figured a female animal of *L. radiatus* in Observations II, pl. XV, which has a curious, winglike projection on the mantle at its posterior base.
[2] There are two figures; the first is *luteolus*, the second is *hydianus*.
[3] Changed in errata to *luteolus*. The figure 306*a*, pl. LXX, is a genuine *multiradiatus*.

† LAMPSILIS LUTEOLUS var. ROSACEUS De Kay.

* *Unio rosaceus* De Kay, Zool. of New York, V, 1843, p. 192, pl. xxxix, figs. 355, 356; pl. xl, fig. 357.[1]—Conrad, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 257.—B. H. Wright, Check List, 1888.

Entire Mississippi drainage, southwest to the Brazos River, Texas; St. Lawrence drainage; entire Dominion of Canada east of the Rocky Mountains; the variety *rosaceus* in the St. Lawrence area.

† LAMPSILIS SUPERIORENSIS Marsh.[2]

* *Unio superiorensis* Marsh, Naut., X, 1897, p. 103, pl. i, figs. 1, 2, 5.

Upper Great Lakes region.

† LAMPSILIS BOREALIS A. F. Gray.[3]

* *Unio borealis* A. F. Gray, Tr. Ottawa Field Nat. Club, 1882, p. 53, pl., 3 figures.—* B. H. Wright, Check List, 1888.

Lower St. Lawrence drainage, to Lake Michigan; Lake of the Woods.

† LAMPSILIS RADIATUS Gmelin.

* *Mya radiata* Gmelin, Syst. Nat., 13th ed., 1792, p. 3220.—* Wood, Gen. Conch., I, 1815, p. 109.—* Dillwyn, Cat. I, 1817, p. 51.—* Wood, Index Test. 2d ed., 1825, p. 12, pl. ii, fig. 2.—* Eaton, Zool. Text-Book, 1826, p. 220.—* Hanley, Index Test., 3d ed., 1856, p. 16, pl. ii, fig. 32.

* *Unio radiata* Lamarck, An. sans. Vert., VI, 1819, p. 73.—* Deshayes, Hist. Nat. des Vers., II, 1830, p. 581; *An. sans. Vert., 2d ed., VI, 1835, p. 535; 3d ed., 1839, p. 668.—* Hanley, Test. Moll., 1842, p. 212.

* *Lampsilis radiata* Stimpson, N. Eng. Shells, 1851, p. 13.

* *Unio radiatus* Spengler, Skriv. Nat. Selsk., V, 1792, p. 3; III, 1793, p. 62.—* Conrad, New F. W. Shells, 1834, p. 71.—* Ferussac, Guer. Mag., 1835, p. 27.—* Conrad, Monog., II, 1836, p. 24, pl. x, fig. 2.—* Sowerby, Rich. Faun. Boreali Am., III, 1836, p. 316.—* Gould, Inv. of Mass., 1841, p. 110, fig. 73.; 1870, p. 170, fig. 474.—* Hanley, Test. Moll., 1842, p. 193; * Biv. Shells, 1843, p. 193.—* Catlow and Reeve, Conch. Nom., 1845, p. 63.—* Conrad, Pr. Ac. N. Sci. Phila., VI, 1853, p. 256.—* Kuster, Conch. Cab. Unio., 1852, p. 29, pl. v, fig. 1.—* H. and A. Adams, Gen. Rec. Moll., II, 1857, p. 494.—* Reeve, Conch. Icon., XVI, 1865, p. 27, pl. xxvii, fig. 139.—* Hartman and Michener, Conch. Cest., 1874, p. 87, fig. 182.—* Latchford, Tr. Ottawa F. Nat. Club, 1882, p. 50.—* B. H. Wright, Check List, 1888.—* H. Carpenter, Naut., IV, 1890, p. 22.—* Pætel, Conch. Sam., III, 1890, p. 165.

* *Margarita* (*Unio*) *radiatus* Lea, Syn., 1836, p. 25; 1838, p. 19.

* *Margaron* (*Unio*) *radiatus* Lea, Syn., 1852, p. 29; 1870, p. 44.

* *Unio pictorum tenuis Indiæ*, etc.—Chemnitz, Conch. Cab., 1788, p. 23, pl. ii, fig. 7.

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[1] The type of De Kay's variety is a delicate shell with peculiarly pallid brown epidermis, slightly rayed, and having a rose-colored nacre. This form is often destitute of the fine tinting of the nacre, and sometimes becomes quite dark, even bronzy or brownish black. It is common in the lakes of the St. Lawrence drainage.

[2] This and *L. borealis* A. F. Gray are doubtful species which seem to stand between *L. luteolus* and *radiatus*. This form is nearer *luteolus*, while Gray's species approaches more nearly to *radiatus*.

[3] In Latchford's Notes on Ottawa *Unionidæ*.

* *Unio virginiana* LAMARCK, An. sans. Vert., VI, 1819, p. 79.—* DELESSERT, Rec. Coq. Lam., 1841, pl. XII, fig.

* *Unio lineata* VALENCIENNES, Enc. Meth., II, 1827, p. 151, pl. CCXLVIII, fig. 5.

* *Unio elongata* GOODRICH, Ill. Nat. Hist., II, 1829, p. 523, fig.

* *Unio tenebrosus* CONRAD, New F. W. Shells, 1834, p. 42, pl. VII, fig. 1; p. 72.—* FERUSSAC, Guer. Mag., 1835, p. 29.—* MÖLLER, Syn. Nov. Gen. 1836, p. 207.—* CHENU, Bib. Conch., 1st ser., III, 1845, pl. II, fig. 5.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 169.

* *Unio melinus* CONRAD, Monog. XI, 1838, p. 101, pl. LV, fig. 1.—SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXVII, fig. 467.

* *Unio mellinus* PÆTEL, Conch. Sam., III, 1890, p. 159.

* *Unio boydianus* LEA, Pr. Am. Phil. Soc., I, 1840, p. 286; * Tr. Am. Phil. Soc., VIII, 1843, p. 216, pl. XVI, fig. 32; * Obs., III, 1842, p. 54, pl. XVI, fig. 22.—* DE KAY, Zool. of New York, Pt. 5, 1843, p. 189.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 245.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—* CHENU, Ill. Conch., 1858, pl. XXXII, figs. 2, 2*a*, 2*b*.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 146.

* *Margaron* (*Unio*) *boydianus* LEA, Syn., 1852, p. 38; 1870, p. 62.

* *Unio crassus* KUSTER, Conch. Cab. Unio., 1854, p. 113, pl. XXXI, fig. 5.

* *Mya oblongata*, WOOD, Index Test., 1856, p. 199, pl. 1; Supplement, fig. 2.

* *Unio obliquiradiatus* REEVE, Conch. Icon., XVI, 1865, pl. XXIX, fig. 151.—* PÆTEL, Conch. Sam., III, 1890, p. 161.

†LAMPSILIS RADIATUS var. CONSPICUUS Lea.

* *Unio conspicuus* LEA, Pr. Ac. N. Sci. Phila., II, 1872, p. 156; * Jl. Ac. N. Sci. Phila., VIII, 1874, p. 34, pl. XI, fig. 31; * Obs., XIII, 1874, p. 38, pl. XI, fig. 31.—* B. H. WRIGHT, Check List, 1888.

St. Lawrence drainage; Manitoba; Atlantic region south to North Carolina (var. *conspicuus* in North Carolina and southern Virginia).

Gould[1] reports *L. radiatus* from the north shore of Lake Superior, and there is a shell in the U. S. National Museum from the northwest boundary of Wisconsin which is probably this species.

†LAMPSILIS HYDIANUS Lea.

* *Unio hydianus* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 14, pl. VI, fig. 14; * Obs., II, 1838, p. 14, pl. VI, fig. 14.—* TROSCHEL, Arch. für Naturg., VII, 1839, p. 234.—* HANLEY, Test. Moll., 1842, p. 192; Biv. Shells, 1843, p. 192, pl. XXIII, fig. 6.—* CATLOW and REEVE, Conch. Nom., 1845, p. 60.—* KUSTER, Conch. Cab. Unio., 1861, p. 201, pl. LXVII, fig. 2.—* CHENU, Ill. Conch., 1858, pl. XVII, fig. 3, 3*a*, 3*b*; pl. XXIV, figs. 7, 7*a*, 7*b*.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXVII, fig. 203.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 155.

* *Margarita* (*Unio*) *hydianus* LEA, Syn., 1836, p. 25; 1838, p. 19.

* *Margaron* (*Unio*) *hydianus* LEA, Syn., 1852, p. 28; 1870, p. 44.

* *Unio placitus* LEA, Pr. Am. Phil. Soc., V, 1852, p. 252;[2] * Tr. Am. Phil. Soc., 1852. p. 279, pl. XXIII, fig. 38; * Obs., V, 1852, p. 35, pl. XXIII, fig. 38.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1838, p. 255.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* KUSTER, Conch. Cab. Unio., 1861, p. 262, pl. LXXXVIII, fig. 2.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., 1890, p. 163.

* *Margaron* (*Unio*) *placitus* LEA, Syn., 1852, p. 29; 1870, p. 46.

Eastern half of Texas; Indian Territory; Arkansas; east to Alabama.

[1] Agassiz, Lake Superior, p. 245.

[2] Merely a young *hydianus*.

†LAMPSILIS APPROXIMUS Lea.[1]

* *Unio approximus* LEA, Pr. Am. Phil. Soc., IV, 1845, p. 164; * Tr. Am. Phil. Soc., X, 1848, p. 74, pl. v, fig. 13; * Obs., IV, 1848, p. 48, pl. v, fig. 13.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 245.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 144.

* *Margaron* (*Unio*) *approximus* LEA, Syn., 1852, p. 28; 1870, p. 44.

Southern Louisiana; southern Alabama.

† LAMPSILIS AFFINIS Lea.[2]

* *Unio affinis* LEA, Pr. Am. Phil. Soc., V, 1852, p. 251; * Tr. Am. Phil. Soc., 1855, p. 271, pl. XIX, fig. 26; * Obs., V, 1852, p. 27, pl. XIX, fig. 26.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 244.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 144.

Margaron (*Unio*) *affinis* LEA, Syn., 1852, p. 27; 1870, p. 42.

Louisiana.

LAMPSILIS CONTRARIUS Conrad.[3]

* *Unio contrarius* CONRAD, Jl. Ac. Nat. Sci. Phila. I, 1850, p. 276, pl. XXXVII, fig. 7.

Ogeechee River, Georgia. (Locality doubtful.)

†LAMPSILIS CLAIBORNENSIS Lea.

Unio claibornensis LEA, Tr. Am. Phil. Soc., VI, 1838, p. 105, pl. XXIV, fig. 115; * Obs., II, 1838, p. 105, pl. XXIV, fig. 115.—* TROSCHEL, Arch. für. Naturg., V, 1839, pl. II, p. 237.—* HANLEY, Test. Moll., 1842, p. 192, Biv. Shells, 1843, p. 192, pl. XXI, fig. 26.—* CATLOW and REEVE, Conch. Nom., 1845, p. 57.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 246.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* CHENU, Ill. Conch., 1858, pl. XXIII, figs. 3, 3*a*, 3*b*.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXX, fig. 357.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 148.

* *Margarita* (*Unio*) *claibornensis* LEA, Syn., 1838, p. 19.

* *Margaron* (*Unio*) *claibornensis* LEA, Syn., 1852, p. 28; 1870, p. 44.

†* *Unio obtusus* LEA, Pr. Am. Phil. Soc., I, 1840, p. 287; * Tr. Am. Phil. Soc., VIII, 1843, p. 201, pl. XI, fig. 13; * Obs., III, 1842, p. 39, pl. XI., fig. 13.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 253.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—* CHENU, Ill. Conch. 1858, pl. XXXI, figs. 2, 2*a*, 2*b*.—* REEVE, Conch. Icon., XVI, 1865, pl. XXVI, fig. 129.—* PÆTEL, Conch. Sam., III, 1890, p. 161.

* *Margaron* (*Unio*) *obtusus* LEA, Syn., 1852, p. 39; 1870, p. 62.

* *Unio pallescens* LEA,[4] Pr. Am. Phil. Soc., IV, 1845, p. 164; * Tr. Am. Phil. Soc., X, 1848, p. 79, pl. VII, fig. 20; * Obs., IV, 1848, p. 79, pl. VII, fig. 20.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 254.—* H. and A. ADAMS, Gen. Rec. Moll.,

[1] Probably only a thin, slightly rayed or rayless variety of *L. hydianus*.

[2] I doubt if this is distinct from *Approximus*.

[3] Dr. Lea places this in the synonymy of *Unio lecontianus* Lea. I have never seen an authentic shell, but the figure given by Conrad in the Journal seems to me more like *Lampsilis obtusus*, and I am inclined to think it is a small male specimen of this species having reversed laterals.

[4] There is only a single specimen in the Lea collection, the type, an old, rather thin, eroded, large shell, in bad condition, but which, I feel sure, is *claibornensis*.

II, 1857, p. 494.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 162.

Margaron (*Unio*) *pallescens* LEA, Syn., 1852, p. 27; 1870, p. 43.

Gulf drainage of the United States, from the Flint to the Pearl River.

† LAMPSILIS PORPHYREUS Lea.[1]

* *Unio porphyreus* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 60; * Jl. Ac. N. Sci. Phila., V, 1862, p. 80, pl. X, fig. 228; * Obs., VIII, 1862, p. 84, pl. X, fig. 228.—B. H. WRIGHT, Check List, 1888.

Margaron (*Unio*) *porphyreus* LEA, Syn., 1870, p. 41.

Cahawba and Coosa rivers, Alabama.

† LAMPSILIS STRAMINEUS Conrad.

* *Unio stramineus* CONRAD, Am. Jl. Sci., XXV, 1834, p. 339, pl. I, fig. 6; * New F. W. Shells, 1834, p. 71.—* FERUSSAC, Guer. Mag., 1835, p. 29.—* MÖLLER, Syn. Nov. Gen., 1836, p. 198.—* CONRAD, Monog., X, 1838, p. 91, pl. L, fig. 1.—* HANLEY, Test. Moll., 1842, p. 209; * Biv. Shells, 1843, p. 209, pl. XXIII, fig. 45.—* CATLOW and REEVE, Conch. Nom., 1845, p. 64.—* CONRAD, Pr. Acad. N. Sci. Phila., VI, 1853, p. 258.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXIX, fig. 217, 1868, pl. LXXX, fig. 422.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL Conch. Sam., III, 1890, p. 168.

* *Margarita* (*Unio*) *stramineus* LEA, Syn., 1836, p. 39; 1838, p. 25.

* *Margaron* (*Unio*) *stramineus* LEA, Syn , 1852, p. 28; 1870, p. 35.

Southern Alabama, southern Mississippi.

† LAMPSILIS REEVIANUS Lea.

* *Unio reevianus* LEA, Tr. Am. Phil. Soc., X, 1852, p. 272, pl. XX, fig. 28; * Obs., V, 1852, p. 28, pl. XX, fig. 28.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 256.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* KUSTER, Conch. Cab. Unio., 1861, p. 247, pl. LXXXIII, fig. 2.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 165.

* *Margaron* (*Unio*) *reevianus* LEA, Syn., 1852, p. 28; 1870, p. 44.

Louisiana; Texas; Arkansas.

† LAMPSILIS POWELLII Lea.

* *Unio powellii* LEA, Pr. Am. Phil. Soc., V, 1852, p. 252; * Tr. Am. Phil. Soc., X, 1853, p. 270, pl. XIX, fig. 25; * Obs., V, 1852, p. 26, pl. XIX, fig. 25.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 255.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* MUSGRAVE, Phot. Conch., 1863, pl. II, fig. 8.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXX, fig. 359.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 164.

* *Margaron* (*Unio*) *powellii* LEA, Syn., 1852, p. 28; 1870, p. 44.

Salina and Clinton, Arkansas; Guadalupe River, Texas; Spring River, Kansas (Cragin).

[1] I am a little uncertain as to where this species should be placed, as I have only seen the two specimens in the Lea collection, which are very poor and distorted. The nacre is purple.

(Group of *Lampsilis ligamentinus.*)

Shell solid, evenly elliptical, not greatly inflated, with a yellowish green epidermis, with broad, usually broken, dark-green rays; beaks not prominent, sculpture fine, restricted in area, pseudocardinals rather small, stumpy; nacre silvery or rarely pinkish. The female shell is not greatly swollen in the post basal region.

†LAMPSILIS LIGAMENTINUS Lamarck.[1]

Unio crassus SAY, Nich. Encyc., II, 1816, pl. I, fig. 8.—* RAFINESQUE, Ann. Gen. Sci. Brux., V, 1820, p. 293.—* HILDRETH, Am. Jl. Sci., XIV, 1828, p. 278, fig. 1.—* FERUSSAC, Guer. Mag., 1835, p. 27.—* HANLEY, Test. Moll., 1842, p. 192; * Biv. Shells, 1843, p. 192.—* CATLOW and REEVE, Conch. Nom., 1845, p. 58.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XL, fig. 220.—* PÆTEL, Conch. Sam., III, 1890, p. 149.

* *Margarita* (*Unio*) *crassus* LEA, Syn., 1836, p. 24; 1838, p. 19.

* *Mya crassa* EATON, Zool. Text-Book, 1826, p. 217.

* *Unio ligamentina* LAMARCK, An. sans Vert., VI, 1819, p. 72.—* FERUSSAC, Guer. Mag., 1835, p. 27.—* DESHAYES, An. sans Vert., 2d. ed., VI, 1835, p. 533; 3d ed., II, 1839, p. 668.

* *Unio ligamentinus* KUSTER, Conch. Cab. Unio, 1852, p. 23, pl. III, fig. 3.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 251.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* CALKINS, Pr. Ottawa Ac. Sci., 1874, p. 43.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 157.—* CALL, Tr. Ac. Sci. St. Louis, VII, p. 22, pl. XXI.

* *Margaron* (*Unio*) *ligamentinus* LEA, Syn., 1852, p. 28; 1870, p. 43.

* *Lampsilis ligamentinus* BAKER, Moll. Chicago, Pt. 1, 1898, p. 108, pl. XVI.—* SMITH, Bull. U. S. Fish Com., 1899, p. 291, pl. LXXIX.

* *Unio ellipticus* BARNES, Am. Jl. Sci., VI, 1823, p. 259, pl. XIII, fig. 19 (outline).—* HILDRETH, Am. Jl. Sci., XIV, 1828, p. 278.

* *Mya elliptica* EATON, Zool. Text-Book, 1826, p. 219.

* *Unio carinatus* BARNES, Am. Jl. Sci., VI, 1823, p. 259, pl. XI, fig. 10.

* *Mya carinata* EATON, Zool. Text-Book, 1826, p. 220.

* *Unio ellipsarius* SAY, Am. Conch., VI, 1834.

* *Unio fasciatus* SAY, Am. Conch., VI. 1834.—* CONRAD, Monog., 1835, p. 3, pl. I.—* FERUSSAC, Guer. Mag., 1835, p. 27.—* POTIEZ and MICHAUD, Gall. Moll., 1844, 153, pl. LVIII, fig. 5.—* KUSTER, Conch. Cab., 1852, p. 31, pl. V, fig. 3.

* *Mya graris* WOOD, Ind. Test. (Hanley) 1856, p. 199, pl. I, fig. 6.

* *Unio graris* PÆTEL, Conch. Sam., III, 1890, p. 154.

* *Unio luteolus* SOWERBY, Conch. Icon., XVI, 1867, pl. LVIII, fig. 293*a*.

* *Unio delodontus* SOWERBY, Conch. Icon., XVI, 1867, pl. LVII, fig. 288.

* *Unio crassidens* SOWERBY, Conch. Icon., XVI, 1868, pl. LXII, fig. 312.

* *Unio pictus* SOWERBY, Conch. Icon., XVI, 1868, pl. LXII, fig. 313.

* *Unio venustus* SOWERBY, Conch. Icon., XVI, 1868, pl. LXIV, fig. 326.

* *Unio upsoni* MARSH, Conch., Ex. 1, 1887, p. 51.[2]—B. H. WRIGHT, Check List, 1888.

[1] Say's name *crassus* applied to this before that of Lamarck was used by Retzius previously for a European *Unio.*

[2] The description was read before the Mercer County, Illinois, Scientific and Historical Society March 2, 1880. Mr. Marsh had copies of the description published and thinks that the species was described on the records. It was not figured.

†LAMPSILIS LIGAMENTINUS var. GIBBUS Simpson.[1]

* *Unio crassus* SOWERBY, Conch. Icon., XVI, 1868, pl. XCV, fig. 520.

Mississippi River drainage generally; southern Michigan; western New York; Manitoba; Ontario; the variety from the Ohio River southward.

†LAMPSILIS ORBICULATUS Hildreth.

* *Unio orbiculatus* HILDRETH, Am. Jl. Sci., XIV, 1828, p. 284.—*HANLEY, Test. Moll., 1842, p. 192; Biv. Shells, 1843, p. 192, pl. XXI, fig. 2.—*CATLOW and REEVE, Conch. Nom., 1845, p. 62.—*CONRAD, Pr. Ac. N. Sci., Phila., VI, 1853, p. 254.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* KUSTER, Conch. Cab., 1861, p. 216, pl. LXXI, figs. 3, 4.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XLIV, fig. 239.—*CALKINS, Pr. Ottawa Ac. Sci., 1874, p. 44.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 162.

* *Margarita* (*Unio*) *orbiculatus* LEA, Syn., 1836, p. 25; 1838, p. 19.

* *Margaron* (*Unio*) *orbiculatus* LEA, Syn., 1852, p. 28; 1870, p. 43.

* *Unio abruptus* SAY, Am. Conch., No. II, 1831, pl. XVII.—*CONRAD, New F. W. Shells, 1834, p. 67.—*CHENU, Bib. Conch., 1st ser., III, 1845, p. 24, pl. VI, figs. 1, 1*a*, 1*b*.—* DESHAYES, An. sans Vert., 2d ed., VI, 1335, p. 555;* 3d ed., II, 1839, p. 674.

* *Unio cyclips* FERUSSAC, Guer. Mag., 1835, p. 28.

* *Unio crassus* CONRAD, Monog., IV, 1836, p. 34, pl. XVI.

Ohio and Cumberland rivers; west to the Mississippi River; north to Minnesota. Some specimens can hardly be separated from *L. higginsii*.

†LAMPSILIS HIGGINSII Lea.[2]

* *Unio higginsii* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 84; * Jl. Ac. N. Sci. Phila., V, 1862, p. 188, pl. XXIV, fig. 258; *Obs., IX, 1863, p. 10, pl. XXIV, fig. 258.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXII, fig. 431.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 155.

* *Margaron* (*Unio*) *higginsii* LEA, Syn., 1870, p. 41.

Ohio River, west to Iowa, and southwest to Kansas.

†LAMPSILIS PINGUIS Lea.[3]

Unio pinguis LEA, Pr. Ac. N. Sci. Phila., I, 1857, p. 84; * Jl. Ac. N. Sci. Phila., IV, 1858, p. 78, pl. XV, fig. 58; *Obs., VI, 1858, p. 78, pl. XV, fig. 58.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *pinguis* LEA, Syn., 1870, p. 44.

St. Peters River, Minnesota. Doubtful.

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[1] A peculiarly humped form of *ligamentinus*, common throughout the southern range of the species, may bear the above name.

[2] A somewhat puzzling species, of which male specimens often approach closely to *Obovaria ellipsis* in form, but the pseudo cardinals are always stumpy and never longitudinal, as they generally are in that genus. It is probably an aberrant form, closely related to *L. orbiculatus*. The females are more inflated in the postbasal region than in any other member of the group.

[3] I have seen only one specimen of this, the type, which is an exceedingly puzzling form. The hinge line is injured and curves in strongly in front of the beaks, where there is a large, irregular lunule, and the pseudocardinals are compressed. It may be a young, diseased *orbiculatus*.

† LAMPSILIS TÆNIATUS Conrad.

* *Unio tæniatus* CONRAD, New F. W. Shells, 1834, pp. 26, 72, pl. IV, fig. 2.[1]—*FERUSSAC, Guer. Mag., 1835, p. 29.—MÖLLER, Syn. Nov. Gen., 1836, p. 201.—* HANLEY, Test. Moll., 1842, p. 191; * Biv. Shells, 1843, p. 191.—*CHENU, Bib. Conch., 1st ser., III, 1845, p. 15.—*CATLOW and REEVE, Conch. Nom., 1845, p. 64.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 258.—* KUSTER, Conch. Cab. Unio, 1862, p. 271, pl. XCI, fig. 4.—* B. H. WRIGHT, Check List, 1888.

* *Margarita* (*Unio*) *tæniatus* LEA, Syn., 1836, p. 24; 1838, p. 19.

* *Unio taniatus* PÆTEL, Conch. Sam., III, 1890, p. 169.

* *Unio menkianus* LEA, Tr. Am. Phil. Soc., V, 1836, p. 76, pl. XIX, fig. 59; *Obs., II, 1838, p. 76, pl. XIX, fig. 59.—* TROSCHEL, Arch. für Naturg., V, 1839, Pt. 2, p. 237.—* HANLEY, Test. Moll., 1842, p. 191; * Biv. Shells, 1843, p. 191, pl. XXIII, fig. 4.—*CATLOW and REEVE, Conch. Nom., 1845, p. 61.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 252.—* CHENU, Ill. Conch., 1858, pl. XIX, figs. 4, 4*a*, 4*b*.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—* KUSTER, Conch. Cab. Unio, 1861, p. 245, pl. LXXXII, fig. 3.—* REEVE, Conch. Icon., XVI, pl. XXVIII, fig. 140.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 159.

* *Margarita* (*Unio*) *menkianus* LEA, Syn., 1838, p. 19.

* *Margaron* (*Unio*) *menkianus* LEA, Syn., 1852, p. 27; 1870, p. 43.

* *Unio pulcher* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 6, pl. III, fig. 6; *Obs., II, 1838, p. 6, pl. III, fig. 6.—* TROSCHEL, Arch. für Naturg., V, 1839, Pt. 2, p. 234.—* HANLEY, Test. Moll., 1842, p. 193; * Biv. Shells, 1843, p. 193, pl. XXIII, fig. 7.—*CATLOW and REEVE, Conch. Nom., 1845, p. 63.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* CHENU, Ill. Conch., 1858, pl. XVII, figs. 2, 2*a*, 2*b*.—* KUSTER, Conch. Cab. Unio, 1861, p. 193, pl. LXI, fig. 5.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 164.

* *Margarita* (*Unio*) *pulcher* LEA, Syn., 1836, p. 25; 1838, p. 19.

* *Margaron* (*Unio*) *pulcher* LEA, Syn., 1852, p. 28; 1870, p. 44.

* *Unio interruptus* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 15, pl. VI, fig. 15; *Obs., II, 1838, p. 15, pl. VI, fig. 15.—* HANLEY, Test. Moll., 1842, p. 191; * Biv. Shells, 1843, p. 191, pl. XXI, fig. 28.—* CATLOW and REEVE, Conch. Nom., 1845, p. 60.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* CHENU, Ill. Conch. 1858, pl. XVII, figs. 4, 4*a*, 4*b*.—* B. H. WRIGHT, Check List, 1888.

* *Margarita* (*Unio*) *interruptus* LEA, Syn., 1836, p. 24; 1838, p. 19.

* *Margaron* (*Unio*) *interruptus* LEA, Syn., 1852, p. 27; 1870, p. 43.

* *Unio latiradiatus* CONRAD, Monog., XI, 1838, p. 96, pl. LIII; Pr. Ac. N. Sci. Phila., VI, 1853, p. 251.—* KUSTER, Conch. Cab. Unio, 1861, p. 208, pl. LXIX, fig. 3.—PÆTEL, Conch. Sam., III, 1890, p. 151.

* *Unio tennesseensis* LEA,[2] Pr. Am. Phil. Soc., I, 1840, p. 288; * Tr. Am. Phil. Soc., VIII, 1843, p. 199, pl. X, fig. 11;[3] *Obs., III, 1842, p. 37, pl. X, fig. 11.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 258.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* CHENU, Ill. Conch., 1858, pl. XXVII, figs. 1, 1*a*, 1*b*.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 169.

* *Margaron* (*Unio*) *tennesseensis* LEA, Syn., 1852, p. 27; 1870, p. 43.

* *Unio perdix* REEVE, Conch. Icon., XVI, 1864, pl. XVIII, fig. 82.

Tennessee and Cumberland river systems.

[1] Lea places this species in the synonymy of his *Unio interruptus*, in the Synopsis. The latter was not published until 1838.

[2] The type is an old female *tæniatus*, very solid, and but slightly rayed.

[3] Lea states in the above citation that this species has radial beak sculpture. The beaks of his type are slightly eroded, having the appearance of somewhat rayed ridges, and I have seen the same thing in the eroded beaks of *Unio rotundatus* Lamarck, but it is not true beak sculpture. Many Unios when decomposing exhibit throughout their shells a somewhat radial structure, and that is what is shown in this case.

† LAMPSILIS PICTUS Lea.

**Unio pictus* LEA, Tr. Am. Phil. Soc., V., 1834, p. 73, pl. XI, fig. 36; *Obs., I, 1834, p. 185, pl. XI, fig. 52.—* FERUSSAC, Guer. Mag., 1835, p. 29.—* HANLEY, Test. Moll., 1842, p. 191; * Biv. Shells, 1843, p. 191, pl. XXIII, fig. 35.—* CATLOW and REEVE, Conch. Nom., 1845, p. 62.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 255.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* KUSTER, Conch. Cab. Unio, 1861, p. 249, pl. LXXXIII, fig. 5.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 163.

**Margarita* (*Unio*) *pictus* LEA, Syn., 1836, p. 24; 1838, p. 19.

**Margaron* (*Unio*) *pictus* LEA, Syn., 1852, p. 27; 1870, p. 43.

† **Unio lindsleyi* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 306; * Jl. Ac. N. Sci. Phila., 1860, p. 351, pl. LVIII, fig. 176; * Obs., VIII, 1860, p. 33, pl. LVIII, fig. 176.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XLII, fig. 233*b*.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 157.

**Margaron* (*Unio*) *lindsleyi* LEA, Syn., 1870, p. 43.

**Unio camelopardalis* SOWERBY, Conch. Icon., XVI, 1866, pl. XLII, fig. 233*a*.

Harpeth River, Tennessee.

†* LAMPSILIS CAMELOPARDILIS Lea.[1]

**Unio camelopardilis* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 92; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 355, pl. LIX, fig. 180; * Obs., VIII, 1860, p. 37, pl. LIX, fig. 180.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 147.

**Margaron* (*Unio*) *camelopardilis*, LEA, Syn., 1870, p. 53.

† **Unio fucatus* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 92; Jl. Ac. N. Sci. Phila., IV, 1860, p. 353, pl. LIX, fig. 178; * Obs., VIII, 1860, p. 35, pl. LIX, fig. 178.—* B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *fucatus*, LEA, Syn., 1870, p. 43.

Tennessee and Cumberland river systems.

†LAMPSILIS PUNCTATUS Lea.

**Unio punctatus* LEA, Pr. Ac. N. Sci. Phila., IX, 1865, p. 89; * Jl. Ac. N. Sci. Phila., VI, 1868, p. 261, pl. XXXII, fig. 76; * Obs., XII, 1869, p. 21, pl. XXXII, fig. 76.—* B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *punctatus* LEA, Syn., 1870, p. 43.

Tennessee River drainage.

†LAMPSILIS PERDIX Lea.

**Unio perdix* LEA, Tr. Am. Phil. Soc., V, 1827, p. 72, pl. XI, fig. 31; * Obs., I, 1834, p. 184, pl. XI, fig. 31.—* FERUSSAC Guer. Mag., 1835, p. 29.—* HANLEY, Test. Moll., 1842, p. 189; * Biv. Shells, 1843, p. 188, pl. XX, fig. 20.—* CATLOW and REEVE, Conch. Nom., 1845, p. 62.—* H. and A. ADAMS, Gen. Rec. Moll. II, 1857, p. 494.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXIX, fig. 82.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 163.

**Margarita* (*Unio*) *perdix* LEA, Syn., 1836, p. 23; 1838, p. 18.

**Margaron* (*Unio*) *perdix* LEA, Syn., 1852, p. 26; 1870, p. 41.

**Unio pectorosus* CONRAD, New F. W. Shells, 1834, p. 37, pl. VI, fig. 1, p. 71.—* FERUSSAC, Guer. Mag., 1835, p. 29.—* CONRAD, Monog. III, 1836, p. 25, pl. XI, fig. 1.—* MÖLLER, Syn. Nov. Gen., 1836, p. 205.—* HANLEY, Test. Moll., 1842, p. 189; * Biv. Shells, 1843, p. 189, pl. XXI, fig. 22.—* CHENU, Bib. Conch., 1st ser., III, 1845, p. 19, pl. II, fig. 8.—* CATLOW and REEVE, Conch. Nom., 1845, p. 62.—KUSTER, Conch. Cab. Unio, 1852, p. 26, pl. IV, fig. 2.—* CONRAD,

[1] It is quite probable that this and the preceding species are merely varieties of the same thing.

Pr. Ac. N. Sci. Phila., VI, 1853, p. 254.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 162.

**Margarita* (*Unio*) *pectorosus* LEA, Syn., 1836, p. 23, 1838, p. 18.

Tennessee and Cumberland river systems.

†LAMPSILIS BRACTEATUS Gould.

**Unio bracteatus* GOULD, Pr. Bost. Soc. N. Hist., V, 1855, p. 228; *Otia Conch., 1862, p. 217.—* B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *bracteatus* LEA, Syn., 1870, p. 43.

Llanos, Guadalupe, and Colorado rivers, Texas.

†LAMPSILIS VENUSTUS Lea.

**Unio venustus* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 4, pl. II, fig. 4; *Obs., II 1838, p. 4, pl. II, fig. 4.—* TROSCHEL, Arch. für. Naturg., V, 1839, II, p. 233.—* HANLEY, Test. Moll., 1842, p. 192; * Biv. Shells, 1843, p. 192, pl. XXIII, fig. 5.—* CATLOW and REEVE, Conch. Nom., 1845, p. 65.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 258.—* CHENU, Ill. Conch., 1858, pl. XXII, figs. 1, 1*a*, 1*b*.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 171.—* CALL, Tr. Acad. Sci. St. Louis, 1895, p. 57.

**Margarita* (*Unio*) *venustus* LEA, Syn., 1836, p. 24; 1838, p. 19.

**Margaron* (*Unio*) *venustus* LEA, Syn., 1852, p. 27; 1870, p. 43.

Potosi, Missouri.

(Group of *Lampsilis anodontoides*.)

Shell elongated, inflated, moderately solid, sharply pointed behind; that of the female much produced at the posterior base, behind which it is diagonally truncate; epidermis very bright, smooth and shining, but feebly rayed; beaks not prominent, marked with very delicate regular sculpture, the posterior loop often open behind; pseudocardinals smooth, generally compressed; nacre shining, white or purplish. Animal with the marsupium very distinct and well rounded below; inner edge of the mantle usually beautifully and evenly toothed behind.

†LAMPSILIS ANODONTOIDES Lea.

†**Unio anodontoides* LEA, Tr. Am. Phil. Soc., IV, 1834, p. 81, pl. VIII, fig. 11; *Obs., I, 1834, p. 91, pl. VIII, fig. 11.—* HANLEY, Test. Moll., 1842, p. 204.—* CATLOW and REEVE, Conch. Nom., 1845, p. 55.—* CHENU, Ill. Conch., 1858, pl. XIV, figs. 3, 3*a*, 3*b*.—* REEVE, Conch. Icon., XVI, 1865, pl. XIX, fig. 87.—* B. H. WRIGHT, Check List, 1888.—* SIMPSON, Proc. U. S. Nat. Mus., XV, 1892, p. 430, pl. LXXI, fig. 7; LXXII, figs. 1, 2, 4.

**Margarita* (*Unio*) *anodontoides* LEA, Syn., 1836, p. 35; 1838, p. 24.

**Margaron* (*Unio*) *anodontoides* LEA, Syn., 1852, p. 36; 1870, p. 58.

**Lampsilis anodontoides* BAKER, Moll. Chicago, Pt. 1, 1898, p. 100, pl. X, figs. 1, 2.—* SMITH, Bull. U. S. Fish Com. 1899, p. 290, pl. LXXVIII.

*?*Unio teres* SAY, Am. Conch., VI, 1834.[1]—* CONRAD, New F. W. Shells, 1834, p. 72; Monog. VI, 1836, p. 52, pl. XXVIII.—* FERUSSAC, Guer. Mag., 1835, p. 27.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 259.—* KUSTER, Conch. Cab. Unio, 1854, p. 68, pl. XVII, figs. 1, 4.

[1] Said to be of Rafinesque, 1820. I can not be positive whether Rafinesque's description is of a young shell of this species or the *fallaciosus*. He gives its length as 3 inches. I therefore use the name applied by Lea, his shell being properly described and figured.

† LAMPSILIS ANODONTOIDES var. FLORIDENSIS Lea.

* *Unio floridensis* LEA,[1] Tr. Am. Phil. Soc., X, 1852, p. 274, pl. XXI, fig. 31; * Obs., V, 1852, p. 30, pl. XXI, fig. 31.—* CONRAD, Pr. Ac. N. Sci., Phila., VI, 1853, p. 249.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 152.

* *Margaron* (*Unio*) *floridensis* LEA, Syn., 1852, p. 39; 1870, p. 62.

Entire Mississippi River drainage except (probably) the upper Missouri. All the Gulf drainage from the Withlacoochee River, Florida, to the Rio Grande, and into Mexico.

† LAMPSILIS FALLACIOSUS (Smith) Simpson.[2]

* *Unio anodontoides* REEVE, Conch. Icon., XVI, 1865, pl. XXI, fig. 97.—* CALKINS, Pr. Ottawa Acad., 1874, p. 41.

* *Lampsilis anodontoides* BAKER, Moll. Chicago, Pt. 1, 1898, pl. X, fig. 3.[3]

* *Unio oriens* SOWERBY, Conch. Icon., 1868, pl. LXIII, fig. 314.

* *Lampsilis fallaciosus* SMITH, Bull. U. S. Fish Com., 1899, p. 291, pl. LXXIX.—* SIMPSON, Pr. Ac. N. Sci., Phila., 1900, p. 74, pl. II, fig. 5.

Upper Mississippi drainage; south to the Cumberland River, Tennessee, and to Arkansas; Red River of the North?

† LAMPSILIS VIRESCENS Lea.[4]

* *Unio virescens* LEA, Pr. Ac. N. Sci., Phila., II, 1858, p. 40; * Jl. Ac. N. Sci., Phila., IV, 1860, p. 341, pl. LV, fig. 166; * Obs., VIII, 1860, p. 23, pl. LV, fig. 166.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *virescens* LEA, Syn., 1870, p. 42.

Tennessee River in northern Alabama.

† LAMPSILIS AUSTRALIS Simpson.

* *Lampsilis australis* SIMPSON,[5] Pr. Ac. N. Sci., Phila., 1900, p. 75, pl. II, fig. 2.

Little Patsaliga Creek, southeastern Alabama.

† LAMPSILIS RECTUS Lamarck.

* *Unio recta* LAMARCK, An. sans Vert., VI, 1819, p. 74.—* VALENCIENNES, Rec. Obs. Zool., II, 1833, p. 234, pl. LIV, fig. 1.—* DESHAYES, An. sans Vert., 2d ed., VII, 1835, p. 537; 3d ed., II, 1839, p. 669.

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[1] *Lampsilis anodontoides* becomes thinner and more delicate in the waters of the eastern Gulf drainage, and in Florida assumes the form called by Lea *Unio floridensis*. The type of the latter is not in the Lea collection.

[2] Figured and the name (supplied by the writer) given by Smith in Bull. U. S. Fish Commission, but not described.

[3] As this species has generally been confounded with the very closely allied *L. anodontoides* of Lea, it is a little difficult to be certain in all cases which form authors have referred to.

[4] A species which seems to combine some of the characters of *L. anodontoides* and *cariosus*, but which probably should be placed here.

[5] This species seems to stand partly between *L. rectus* and *L. anodontoides*. In the character of color both of nacre and epidermis the former is quite widely separated from the latter, though specimens of *rectus* from Michigan and other northern localities sometimes have a tawny epidermis. In *L. australis* the nacre is silvery, and the color of the epidermis approaches to some extent that of *anodontoides*.

* *Unio* (*Ligumia*) *recta* SWAINSON, Treat. on Mal., 1840, pp. 267, 274, fig. LV.

Unio rectus SHORT and EATON, Transylvania Jl., 1831, p. 77.—* CONRAD, New F. W. Shells, 1834, p. 71.—* SAY, Am. Conch., VI, 1834.—* FERUSSAC, Guer. Mag., 1835, p. 27.—*CONRAD, Monog., III, 1836, p. 33, pl. XV.—* HANLEY, Test. Moll., 1842, p. 204.—* C. B. ADAMS, Thompson's Hist. of Vt., 1842, p. 167; * F. W. and L. Sh. of Vermont, 1842, p. 17.—* HANLEY, Biv. Shells, 1843, p. 204.—* DE KAY, Zool. of N. Y., Pt. 5, 1843, p. 195.—* POTIEZ and MICHAUD, Gall. Moll., 1844, II, p. 149, pl. LVII, figs. 3, 4.—* CATLOW and REEVE, Conch. Nom., 1845, p. 63.—* KUSTER, Conch. Cab. Unio, 1852, p. 35, pl. VI, fig. 1; VII, fig. 1.—* CONRAD, Pr. Ac. N. Sci., Phila., VI, 1853, p. 256.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—* CHENU, Man., 1859, II, p. 139, fig. 675.—REEVE, Conch. Icon., XVI, 1865, pl. XIX, fig. 86.—* CALKINS, Pr. Ottawa Ac., 1874, p. 44.—* LATCHFORD, Tr. Ottawa F. N. Club, 1882, p. 50.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 165.—* CALL, Tr. Ac. Sci., St. Louis, VII, 1895, p. 43, pl. VII.

* *Margarita* (*Unio*) *rectus* LEA, Syn., 1836, p. 34; 1838, p. 23.

* *Margaron* (*Unio*) *rectus* LEA, Syn., 1852, p. 35; 1870, p. 57.

* *Lampsilis rectus* SMITH, Bull. U. S. Fish Com., 1899, p. 290, pl. LXXVIII.

†* *Unio latissima* RAFINESQUE, Ann. Gen. Sci. Phys. Brux., Pt. 13, V, 1820, p. 297, pl. LXXX, figs. 14, 15.

* ?*Unio prælongus* BARNES,[1] Am. Jl. of Sci., VI, 1823, p. 261, pl. XIII, fig. 11.—* HILDRETH, Am. Jl. of Sci., XIV, 1828, p. 286, fig. 18.

* *Mya prælonga* EATON, Zool. Text-Book, 1826, p. 220.—WOOD, Ind. Test (Hanley), 1856, p. 200, pl. I, Supp., fig. 11.

* *Eurynea prælonga* STIMPSON, Shells of N. Eng., 1851, p. 13.

†* *Unio sageri* CONRAD, Monog., VI, 1836, p. 53, pl. XXIX, fig. 1.

* ?*Unio arquatus*[2] CONRAD, Jl. Ac. Nat. Sci. Phila., 1854, p. 297, pl. XXVI, fig. 8.—B. H. WRIGHT, Check List, 1888.

Entire Mississippi drainage; Alabama River drainage; Red River of the North; St. Lawrence system. DeCamp's *Unio anodontoides*, reported from Michigan, is a tawny colored variety of this species according to Walker.

(Group of *Lampsilis nasutus*.)

Shell elongated, thin, compressed, with a distinct posterior ridge, and drawn out to a long, pointed beak behind; epidermis rather dull, olive green, and feebly rayed; beaks low, sculptured with fine, close-set ridges, which are slightly looped in front and are parallel with the axis of the shell behind; hinge teeth delicate and compressed; nacre bluish; female shell not greatly produced in the post-basal region. Animal with the marsupium often occupying the greater part of the length of the outer gills posteriorly; inner gills free or united to the abdominal sac.

†LAMPSILIS NASUTUS Say.

Unio nasutus SAY, Nich. Encyc., 1st ed., 1816, pl. IV, fig. 1.—* SWAINSON, Zool. Ill., 1st ser., I, 1821, pl. LVII.—*CONRAD, New F. W. Shells, 1834, p. 70.—*FERUSSAC, Guerin Mag., 1835, p. 26.—* CONRAD, Monog., IV, 1836, p. 38, pl. XVIII, fig. 1,

[1] Barnes only gives an outline of his shell, which appears to me more like his *U. gibbosus* than *rectus*. However in deference to the opinions of Hildreth, Lea, and others, I place it in the synonymy of *L. rectus*. Hildreth's description answers fairly well to *rectus*, and it was submitted to Barnes for his inspection.

[2] Lea believes this to be a distorted *rectus*. I am not quite certain of it.

part.[1]—* GOULD, Inv. of Mass., 1841, p. 109, fig. 71.—* BINNEY, Gould's Inv., 1870, p. 169, fig. 473.—* HANLEY, Test. Moll., 1842, p. 206.—* DE KAY, Zool. of N. Y., Pt. 5, 1843, p. 191, pl. XX, fig. 239.—* HANLEY, Biv. Shells, 1843, p. 206.—CATLOW and REEVE, Conch. Nom., 1845, p. 61.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 252.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—* KUSTER, Conch. Cab. Unio, 1861, p. 223, pl. LXXV, fig. 4.—* REEVE, Conch. Icon., XVI, 1865, pl. XXI, fig. 94.—* HARTMAN and MICHENER, Conch. Cest., 1874, p. 70, fig. 186.—* B. H. WRIGHT, Check List, 1888.—* H. CARPENTER, Naut., III, 1889, p. 94.—* PÆTEL, Conch. Sam., III, 1890, p. 160.

* *Margarita* (*Unio*) *nasutus* LEA, Syn., 1836, p. 37; 1838, p. 24.

* *Margaron* (*Unio*) *nasutus* LEA, Syn., 1852, p. 37; 1870, p. 60.

* *Unio nasuta* LAMARCK, An. sans Vert., VI, 1819, p. 75.—* DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 538; 3d ed., II, 1839, p. 669.—* HANLEY, Test. Moll., 1842, p. 208; * Biv. Shells, 1843, p. 208.

* *Mya nasuta* EATON, Zool. Text-Book, 1826, p. 218.—* WOOD, Index Test. (Hanley), 1856, p. 199, pl. I, Supp., fig. 4.

* *Eurynea nasuta* AGASSIZ, Shells of New Eng., 1851, p. 13; Arch. für Naturg., I, 1852, p. 45.

* *Unio rostrata* VALENCIENNES, Rec. Obs. Zool., II, 1833, p. 233, pl. LIII, fig. 3.

* *Unio vaughanianus* SOWERBY, Conch. Icon., XVI, 1868, pl. LXI, fig. 308.

St. Lawrence drainage; streams flowing into the Atlantic south to North Carolina.

(Group of *Lampsilis subrostratus*.)

Shell elliptical to elongate, distinctly pointed behind, the point well above the middle of the height, that of the female conspicuously swollen at the posterior base and obliquely truncated behind; epidermis varying from olive to brown, generally more or less rayed and slightly roughened; beaks not prominent, sculptured with fine, delicate, parallel bars, which are somewhat looped in front and generally descend obliquely behind; pseudocardinals usually compressed; nacre bluish to purple. Animal with inner gills often more or less free from the abdominal sac; posterior base of mantle of female generally toothed.

† LAMPSILIS SUBROSTRATUS SAY.

Unio subrostratus SAY, N. Harmony Diss., Jan. 15, 1831; * Am. Conch., VI, 1834.—* CONRAD, New F. W. Shells, 1834, p. 72.—* FERUSSAC, Guer. Mag., 1835, p. 26.—* L. W. SAY, Terr. and Fluv. Shells, 1840, p. 7.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 258.—KUSTER, Conch. Cab., 1861, p. 203, pl. LXVIII.—* LEWIS, Pr. Ac. N. Sci. Phila., VIII, 1878, p. 273.—* CALL, Am. Nat., XIII, p. 392.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch., Sam., III, 1890, p. 168.

* *Unio nashrillianus* LEA, Tr. Am. Phil. Soc., V, 1834, p. 100, pl. XIV, fig. 43; * Obs., I, 1834, p. 212, pl. XIV, fig. 43.—* FERUSSAC, Guer. Mag., 1835, p. 29.—* HANLEY, Test. Moll., 1842, p. 193; Biv. Shells, 1843, p. 193, pl. XXIII, fig. 31.—* CATLOW and REEVE, Conch. Nom., 1845, p. 61.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 252.—* KUSTER, Conch. Cab. Unio, 1861, p. 224, pl. LXXVI, figs. 1, 2.—SOWERBY, Conch. Icon., XVI, 1866, pl. XXX, fig. 158.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 160.

[1] Conrad gives three figures under fig. 1. The first and second are *U. fisherianus;* the third is a female *nasutus*.

**Margarita* (*Unio*) *nashvillianus* LEA, Syn., 1836, p. 26; 1838, p. 20.
**Margaron* (*Unio*) *nashvillianus* LEA, Syn., 1852, p. 29.
**Margaron* (*Unio*) *nashvilliensis* LEA, Syn., 1870, p. 45.
†**Unio mississippiensis* CONRAD, Jl. Ac. N. Sci. Phila., I, 1850, p. 277, pl. XXXVIII, fig. 11.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 252.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—*KUSTER, Conch. Cab. Unio, 1861, p. 245, pl. LXXXII, fig. 3.—*REEVE, Conch. Icon., XVI, 1865, pl. XIX, fig. 85.—*B. H. WRIGHT, Check List, 1888.—*P.ETEL, Conch. Sam., III, 1890, p. 159.
**Margaron* (*Unio*) *mississippiensis* LEA, Syn., 1852, p. 29; 1870, p. 60.
**Unio rutersvillensis* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 155; *Jl. Ac. N. Sci. Phila., IV, 1860, p. 355, pl. LX, fig. 181; *Obs., VIII, 1860, p. 38, pl. LX, fig. 181.—*B. H. WRIGHT, Check List, 1888.
**Margaron* (*Unio*) *rutersvillensis* LEA, Syn., 1870, p. 43.
†**Unio topekaensis* LEA, Pr. Ac. N. Sci. Phila., XII, 1868, p. 144; *Jl. Ac. N. Sci. Phila., VI, 1869, p. 313, pl. XLIX, fig. 126; *Obs., XII, 1869, p. 73, pl. XLIX, fig. 126.—*B. H. WRIGHT, Check List, 1888.
**Margaron* (*Unio*) *topekaensis* LEA, Syn., 1870, p. 43.
**Unio cocoduensis* REEVE, Conch. Icon., XVI, 1865, pl. 24, fig. 117.

Entire Mississippi drainage north to about latitude 41°. Eastern half of Texas.

†*LAMPSILIS LIENOSUS Conrad.

**Unio lienosus* CONRAD, Am. Jl. Sci., XXV, 1834, p. 339, pl. I, fig. 4; *New F. W. Shells, 1834, p. 70.—*FERUSSAC, Guer. Mag., 1835, p. 25.—*CONRAD, Monog. VII, 1836, p. 60, pl. XXXIV, fig. 2.—*MÖLLER, Syn. Nov. Gen., 1836, p. 197.—*HANLEY, Test. Moll., 1842, p. 194; *Biv. Shells, 1843, p. 194, pl. XXI, fig. 32.—*CATLOW and REEVE, Conch. Nom., 1845, p. 60.—*KUSTER, Conch. Cab. Unio, 1852, p. 67, pl. XVI, fig. 3.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 251.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—*SOWERBY, Conch. Icon., XVI, 1866, pl. XXXII, fig. 166; 1868, pl. LXXV, fig. 388.—*B. H. WRIGHT, Check List, 1888.—*P.ETEL, Conch. Sam., III, 1890, p. 157.
**Margarita* (*Unio*) *lienosus* LEA, Syn., 1836, p. 26; 1838, p. 20.
**Margaron* (*Unio*) *lienosus* LEA, Syn., 1852, p. 29; 1870, p. 45.
**Unio saxeus* CONRAD, Monog., XII, 1840, p. 109, pl. LX, fig. 1; Pr. Ac. N. Sci. Phila., VI, 1853, p. 257.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—*B. H. WRIGHT, Check List, 1888.—*P.ETEL, Conch. Sam., III, 1890, p. 166.
**Margaron* (*Unio*) *saxeus* LEA, Syn., 1852, p. 27; 1870, p. 42.
**Unio caliginosus* LEA, Pr. Am. Phil. Soc., IV, 1845, p. 165; *Tr. Am. Phil. Soc., X, 1848, p. 79, pl. VII, fig. 21; *Obs., IV, 1848, p. 53, pl. VII, fig. 21.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 246.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—*KUSTER, Conch. Cab. Unio, 1861, p. 180, pl. LVI, fig. 7.—*B. H. WRIGHT, Check List, 1888.—*P.ETEL, Conch. Sam., III, 1890, p. 147.
**Margaron* (*Unio*) *caliginosus* LEA, Syn., 1852, p. 29; 1870, p. 45.
**Unio fontanus* CONRAD,[1] Am. Jl. Sci., II, 1866, p. 279, pl. XV, fig. 13.—*B. H. WRIGHT, Check List, 1888.

LAMPSILIS LIENOSUS var. UNICOSTATUS B. H. Wright.

**Unio unicostatus* B. H. WRIGHT, Naut., XIII, 1899, p. 69.

Lower Mississippi River drainage north to the lower Ohio; east to southwest Georgia.

[1] The characters are poor in the indifferent type in the Academy of Natural Sciences in Philadelphia, but I believe that it is a *Lampsilis lienosus*.

†LAMPSILIS CONCESTATOR Lea.

**Unio concestator* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 31; *Jl. Ac. N. Sci. Phila., IV, 1858, p. 66, pl. XII, fig. 48; *Obs., VI, 1858, p. 66, pl. XII, fig. 48.—*KUSTER, Conch. Cab. Unio, 1861, p. 178, pl. LVI, fig. 3.—*REEVE, Conch. Icon., XVI, 1865, pl. XXVI, fig. 128.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 148.—*SIMPSON, Pr. U. S. Nat. Mus., XVI, 1892, p. 416, pl. LVIII, figs. 2–4.

**Margaron* (*Unio*) *concestator* LEA, Syn., 1870, p. 45.

†**Unio intercedens* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 32; *Jl. Ac. N. Sci. Phila., IV, 1858, p. 77, pl. XV, fig. 57; *Obs., VI, 1858, p. 77, pl. XV, fig. 57.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 155.

**Margaron* (*Unio*) *intercedens* LEA, Syn., 1870, p. 45.

†**Unio fallax* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 32; *Jl. Ac. N. Sci. Phila., IV, 1858, p. 79, pl. XV, fig. 59; *Obs., VI, 1858, p. 79, pl. XV, fig. 59.—*KUSTER, Conch. Cab. Unio, 1861, p. 206, pl. LXVIII, fig. 7.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXXX, fig. 418.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 152.

**Margaron* (*Unio*) *fallax* LEA Syn., 1870, p. 45.

†**Unio contiguus* LEA,[1] Proc. Ac. N. Sci. Phila., VI, 1861, p. 392; *Jl. Ac. N. Sci. Phila., V, 1862, p. 199, pl. XXVIII, fig. 268; Obs., IX, 1863, p. 21, pl. XXVIII, fig. 268.—B. H. WRIGHT, Check List, 1888.—PÆTEL, Conch. Sam., III, 1890, p. 148.

**Margaron* (*Unio*) *contiguus* LEA, Syn., 1870, p. 45.

**Unio bi-caelatus* REEVE, Conch. Icon., XVI, 1865, pl. XXVI, fig. 130.—*PÆTEL, Conch. Sam., III, 1890, p. 146.

†**Unio genuinus* LEA, Pr. Ac. N. Sci. Phila., XX, 1868, p. 161; *Jl. Ac. N. Sci. Phil., VI, 1868, p. 305, pl. XLVI, fig. 117; *Obs., XII, 1869, p. 64, pl. XLVI, fig. 117.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *genuinus* LEA, Syn., 1870, p. 45.

North Carolina, in streams flowing into the sea, to Louisiana, and possibly to Texas. Some specimens are very close to *lienosus*.

LAMPSILIS PROPRIUS Lea.[2]

**Unio proprius* LEA, Pr. Ac. N. Sci. Phila., IX, 1865, p. 89; *Jl. Ac. N. Sci. Phila., VI, 1869, p. 256, pl. XXXI, fig. 70; *Obs., XII, 1869, p. 16, pl. XXXI, fig. 70.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *proprius* LEA, Syn., 1870, p. 45.

**Unio striatus* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXVIII, fig. 407.

Walker County, Georgia; Clinch River, Virginia.

LAMPSILIS PUNICEUS Haldeman.

**Unio puniceus* HALDEMAN,[3] Jl. Ac. N. Sci. Phila., VIII, 1842, p. 201.—CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 255.—B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *puniceus* LEA, Syn., 1870, p. 46.

Holston River, Tennessee.

[1] A large rather thin *L. concestator*, I think.

[2] Possibly distinct, but more likely a mere light-colored variety of *L. Vanuxemensis*.

[3] I believe that this species has never been figured. From the description I should judge that it belonged in this group, and it may be synonymous with some one of its species.

†LAMPSILIS VANUXEMENSIS Lea.

**Unio vanuxemensis* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 36, pl. XI, fig. 31; *Obs., II, 1838, p. 36, pl. XI, fig. 31.—*TROSCHEL, Arch. für Naturg, V, 1839, Pt. 2, p. 436.—*HANLEY, Test. Moll., 1842, p. 193; *Biv. Shells, 1843, p. 193, pl. XXII, fig. 56.—*CATLOW and REEVE, Conch. Nom., 1845, p. 65.—*CHENU, Ill. Conch., 1858, pl. XIX, figs. 3, 3*a*, 3*b*.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—*KUSTER, Conch. Cab. Unio, 1862, p. 272, pl. XCI, fig. 6.—*PÆTEL, Conch. Sam., III, 1890, p. 171.

**Margarita* (*Unio*) *vanuxemensis* LEA, Syn., 1836, p. 26; 1838, p. 19.

**Margaron* (*Unio*) *vanuxemensis* LEA, Syn., 1852, p. 29.

**Unio vanuxemensis* CONRAD, Pr. Ac. N. Sci. Phila., 1853, p. 259.

**Margaron* (*Unio*) *vanuxemii* LEA, Syn., 1870, p. 46.

**Unio vanuxemii* B. H. WRIGHT, Check List, 1888.

†**Unio nitens* LEA, Pr. Am. Phil. Soc., I, 1840, p. 288; *Tr. Am. Phil. Soc., VIII, 1843, p. 205, pl. XII, fig. 19; *Obs., III, 1842, p. 43, pl. XII, fig. 19.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 253.—*KUSTER, Conch. Cab., 1856, p. 163, pl. XLVII, fig. 1.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 498.—*CHENU, Ill. Conch., 1858, pl. XXVIII, figs. 5, 5*a*, 5*b*.—*REEVE, Conch. Icon. XVI, 1865, pl. XXVIII, fig. 144.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 161.

**Margaron* (*Unio*) *nitens* LEA, Syn., 1852, p. 29; 1870, p. 45.

†**Unio umbrans* LEA, Pr. Ac. N. Sci. Phila., I, 1857, p. 104; *Jl. Ac. N. Sci. Phila., V, 1858, p. 72, pl. XIII, fig. 53; *Obs., VI, 1858, pl. XIII, fig. 53.—*SOWERBY, Conch. Icon., XVI, 1866, pl. XXXIV, fig. 179.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 171.

**Margaron* (*Unio*) *umbrans* LEA, Syn., 1870, p. 45.

†*Unio tenebricus* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 171; *Jl. Ac. N. Sci. Phila., IV, 1858, p. 83, pl. XVII, fig. 63; *Obs., VI, 1858, p. 83, pl. XVI, fig. 63.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *tenebricus* LEA, Syn., 1870, p. 45.

†**Unio pybasii* LEA, Pr. Ac. N. Sci. Phila., II, 1858, p. 40; *Jl. Ac. N. Sci. Phila., V, 1862, p. 67, pl. VI, fig. 216; *Obs., VIII, 1862, p. 71, pl. VI, fig. 216.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 164.

**Margaron* (*Unio*) *pybasii* LEA, Syn., 1870, p. 45.

†**Unio fabaceus* LEA,[1] Proc. Ac. N. Sci. Phila., V, 1861, p. 38; *Jl. Ac. N. Sci. Phila., V, 1862, p. 90, pl. XIII, fig. 238; *Obs., VIII, 1862, p. 94, pl. XIII, fig. 238.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *fabaceus* LEA, Syn., 1870, p. 46.

†**Unio copei* LEA,[2] Pr. Ac. N. Sci. Phila., XII, 1868, p. 144; *Jl. Ac. N. Sci. Phila., VI, 1869, p. 307, pl. XLVII, fig. 120; *Obs., XII, 1869, p. 67, pl. XLVII, fig. 120.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *copei* LEA, Syn., 1870, p. 45.

†**Unio dispansus* LEA, Pr. Ac. N. Sci. Phila., I, 1871, p. 191; *Jl. Ac. N. Sci. Phila., VIII, 1874, p. 19, pl. VI, fig. 16; *Obs., XIII, 1874, p. 23, pl. VI, fig. 16.—*B. H. WRIGHT, Check List, 1888.

Cumberland and Tennessee river systems; headwaters of the Coosa.

†LAMPSILIS OBSCURUS Lea.

**Unio obscurus* LEA, Tr. Am. Phil. Soc., VI, 1839, p. 7, pl. III, fig. 7, *Obs., II, 1838, p. 7, pl. III, fig. 7.—*TROSCHEL, Arch. für Naturg., V, 1839, Pt. 2, p. 234.—*HANLEY, Test. Moll., 1842, p. 194; *Biv. Shells, 1843, p. 194, pl. XXII, fig. 58.—

[1] A small, rather short form of *vanuxemensis*.

[2] The type is rather thin and high, but is no doubt a mere variation of the above species.

*CATLOW and REEVE, Conch. Nom., 1845, p. 61.—*CHENU, Ill. Conch., 1858, pl. XVII, figs. 1, 1*a*, 1*b*.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—*KUSTER, Conch. Cab. Unio, 1861, p. 220, pl. LXXIV, fig. 3.—*PÆTEL, Conch. Sam., III, 1890, p. 161.

**Margarita* (*Unio*) *obscurus* LEA, Syn., 1836, p. 26; 1838, p. 20.

**Margaron* (*Unio*) *obscurus* LEA, Syn., 1852, p. 29; 1870, p. 45.

**Margarita* (*Unio*) *zeiglerianus* LEA, Syn., 1836, p. 26; 1838, p. 20.

**Unio zeiglerianus* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 32, pl. X, fig. 27; *Obs., II, 1838, p. 32, pl. X, fig. 27.—*TROSCHEL, Arch. für Naturg., V, 1839, Pt. 2, p. 235.—*HANLEY, Test. Moll., 1842, p. 193, *Biv. Shells, 1843, p. 193, pl. XXII, fig. 57.—*CATLOW and REEVE, Conch. Nom., 1845, p. 65.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—*CHENU, Ill. Conch., 1858, pl. XXIV, figs. 2, 2*a*, 2*b*.—*SOWERBY, Conch. Icon., XVI, 1866, pl. XXXVI, fig. 19.—*B. H. WRIGHT, Check List, 1888.—PÆTEL, Conch. Sam., III, 1890, p. 172.

**Margaron* (*Unio*) *zeiglerianus* LEA, Syn., 1852, p. 29; 1870, p. 45.[1]

Tennessee and Cumberland river systems; Lower Ohio and its tributaries.

†LAMPSILIS PRATTII Lea.

**Unio prattii* LEA, Pr. Ac. N. Sci. Phila., II, 1858, p. 166; *Jl. Ac. N. Sci. Phila., IV, 1859, p. 206, pl. XXIV, figs. 88, 88*a*; *Obs., VII, 1859, p. 24, pl. XXIV, fig. 88.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *prattii* LEA, Syn., 1870, p. 45.

Chattahoochee River, Georgia.

†LAMPSILIS VAUGHANIANUS Lea.

**Margarita* (*Unio*) *vaughanianus* LEA, Syn., 1836, p. 39;[2] 1838, p. 25.

**Unio vaughanianus* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 5, pl. III, fig. 5; *Obs., II, 1838, p. 5, pl. III, fig. 5.—*TROSCHEL, Arch. für Naturg., V, 1839, Pt. 2. p. 234.—*HANLEY, Test. Moll., 1842, p. 208; *Biv. Shells, 1843, p. 208, pl. XXII, fig. 48.—*CATLOW and REEVE, Conch. Nom., 1845, p. 65.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 259.—*CHENU, Ill. Conch., 1858, pl. XXI, figs. 11*a*, 11*b*.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 171.

**Margaron* (*Unio*) *vaughanianus* LEA, Syn., 1852, p. 38; 1870, p. 61.

Near Camden, South Carolina.

†LAMPSILIS OGEECHEENSIS Conrad.

**Unio ogeecheensis* CONRAD, Ann. and Mag. N. Hist., IV, 1849, p. 300; Jl. Ac. N. Sci. Phila., I, 1850, p. 275, pl. XXXVII, figs. 3, 4; *Pr. Ac. N. Sci. Phila., VI, 1853, p. 254.

**Unio prevostianus* LEA, Tr. Am. Phil. Soc., X, 1852, p. 269, pl. XIX, fig. 24; *Obs., V, 1852, p. 25, pl. XIX, fig. 24.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 255.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—*MUSGRAVE, Phot. Conch., 1863, pl. II, fig. 10.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 164.

**Margaron* (*Unio*) *prevostianus* LEA, Syn., 1852, p. 29; 1870, p. 44.

**Unio proximus* LEA, Pr. Am. Phil. Soc., V, 1852, p. 252; *Tr. Am. Phil. Soc., X, 1852,

[1] I believe that the *L. obscurus* is only the fully adult form of *U. zeiglerianus*, which when quite young shows very delicate and beautiful rays.

[2] In this case, owing to delay in the publication of the transactions, the name appeared in the Synopsis first, and under the generic name *Margarita*.

p. 271, pl. XX, fig. 27; *Obs., V, 1852, p. 27, pl. XX, fig. 27.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 255.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—*B. H. WRIGHT, Check List, 1888.—P.ETEL, Conch. Sam., III, 1890, p. 164.

**Margaron* (*Unio*) *proximus* LEA, Syn., 1852, p. 29; 1870, p. 45.

Unio tenerus SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 416, pl. LVIII, figs. 5 and 8.[1]

Neuse River, North Carolina; south to north Florida; west to the Etowah River, Georgia; Duck River, Tennessee.

† LAMPSILIS CONSTRICTUS Conrad.

**Unio lienosus* var. *constrictus* CONRAD, Monog. X, 1838, p. 91, pl. XLIX, fig. 4.

**Unio constrictus* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 247.—*H. and A. ADAMS, Gen. Rec. Moll. II, 1857, p. 493.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXVII, fig. 464.—*B. H. WRIGHT, Check List, 1888.—*P.ETEL, Conch. Sam., III, 1890, p. 148.

**Margaron* (*Unio*) *constrictus* LEA, Syn., 1852, p. 29; 1870, p. 46.

**Unio genthii* LEA, Pr. Ac. N. Sci. Phila., I, 1857, p. 85; *Jl. Ac. N. Sci. Phila., 1862, p. 57, pl. II, fig. 204; *Obs. VIII, 1862, p. 61, pl. II, fig. 204.—*B. H. WRIGHT, Check List, 1888.—*P.ETEL, Conch. Sam., III, 1890, p. 153.

**Margaron* (*Unio*) *genthii* LEA, Syn., 1870, p. 41.

James River, Virginia; south to South Carolina; Floyd County, northwest Georgia; northern Alabama; Tennessee.

† LAMPSILIS APICINUS Lea.

**Unio apicinus* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 32; *Jl. Ac. N. Sci. Phila., IV, 1858, p. 76, pl. XIV, fig. 56; *Obs., VI, 1858, p. 76, pl. XIV, fig. 56.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *apicinus* LEA, Syn., 1870, p. 44.

Othcalooga Creek, Gordon County, Georgia.

† LAMPSILIS OCCIDENTALIS Conrad.

**Unio occidentalis* CONRAD, Monog., VII, 1836, p. 64, pl. XXXVI, fig. 1; *Pr. Ac. N. Sci. Phila., VI, 1853, p. 253.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—*B. H. WRIGHT, Check List, 1888.—*P.ETEL, Conch. Sam., III, 1890, p. 161.

**Margaron* (*Unio*) *occidentalis* LEA, Syn., 1852, p. 33; 1870, p. 53.

Current and Little Red rivers, Arkansas.

† LAMPSILIS NIGERRIMUS Lea.

**Unio nigerrimus* LEA, Tr. Am. Phil. Soc., X, 1852, p. 268, pl. XVIII, fig. 23; *Obs., V, 1852, p. 24, pl. XVIII, fig. 23.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 253.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—*B. H. WRIGHT, Check List, 1888.—*P.ETEL, Conch. Sam., III, 1890, p. 161.

**Margaron* (*Unio*) *nigerrimus* LEA, Syn., 1852, p. 31; 1870, p. 49.

**Unio fuligo* REEVE, Conch. Icon., XVI, 1856, pl. XXX, fig. 159.—*P.ETEL, Conch. Sam., III, 1890, p. 153.

Alexandria, Louisiana, to eastern Texas; Indiana?

(Group of *Lampsilis iris.*)

Shell rather small, elliptical, moderately solid in front, thinner behind; epidermis covered with dark green, broken rays, beak sculp-

[1] As of Ravenel, who, however, never described the species.

ture consisting of irregular ridges and corrugations that have a tendency to fall into two loops, which are sometimes slightly nodulous below; nacre bluish, becoming beautifully iridescent posteriorly. Animal having the inner branchiæ free or united to the abdominal sac; mantle border often maculated and generally, in the female, having papillæ below the marsupium; marsupium having a strong, deep sulcus parallel with and near to the base.

†LAMPSILIS IRIS Lea.

**Unio iris* LEA, Tr. Am. Phil. Soc., III, 1830, p. 439, pl. IX, fig. 18; *Obs., I, 1834, p. 53, pl. XI, fig. 18.—*CONRAD, New F. W. Shells, 1834, p. 69.—*FERUSSAC, Guer. Mag., 1835, p. 26.—*DESHAYES. An. sans Vert. 2d ed., VI, 1835, p. 550; 3d. ed., II, 1839, p. 673.—*HANLEY, Test. Moll. 1842, p. 206; *Biv. Shells, 1843, p. 206, pl. XXI, fig. 37.—*CATLOW and REEVE, Conch. Nom., 1845, p. 60.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—*CHENU, Ill. Conch., 1858, pl. VIII, figs. 7, 7*a*, 7*b*.—*REEVE, Conch. Icon., XVI, 1865, pl. XXIX, fig. 148.—*CALKINS. Pr. Ottawa Ac. Sci., 1874, p. 42.—*B. H. WRIGHT, Check List. 1888.

**Margarita* (*Unio*) *iris* LEA. Syn., 1836, p. 37; 1838, p. 25.

**Margaron* (*Unio*) *iris* LEA, Syn., 1852, p. 38; 1870, p. 60.[1]

**Lampsilis iris* BAKER, Moll. Chicago, Pt. 1, 1898, p. 105, pl. XIII, fig. 1; XIV, fig. 2.

**Unio creperus* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 33, pl. X, fig. 28; *Obs., II, 1838, p. 33, pl. X, fig. 28.—*TROSCHEL, Arch. für Naturg., V, 1839, Pt. 2, p. 235.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 247.—*CHENU. Ill. Conch., 1858, pl. XXIII, figs. 5, 5*a*, 5*b*.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—*B. H. WRIGHT, Check List, 1888.

**Margarita* (*Unio*) *creperus* LEA, Syn. 1836, p. 28; 1838, p. 20.

**Margaron* (*Unio*) *creperus* LEA, Syn. 1852, p. 31; 1870, p. 48.

**Unio cresserus* HANLEY, Test. Moll., 1842, p. 196.—*CATLOW and REEVE, Conch. Icon., 1845, p. 58.

†* *Unio novi-eboraci* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 104, pl. XXIV, fig. 114; *Obs., II, 1838, p. 104, pl. XXIV, fig. 114.—*TROSCHEL, Arch. für Naturg., V, 1839, Pt. 2, p. 237.—*HANLEY, Test. Moll., 1842, p. 190; *Biv. Shells, 1843, p. 190.—*DE KAY, Zool. of N. Y., Pt. 5, 1843, pl. XX, fig. 240.—*CATLOW and REEVE, Conch. Nom, 1845, p. 61.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—*CHENU, Ill. Conch., 1858, pl. XIX, figs. 5, 5*a*, 5*b*.—*KUSTER, Conch. Cab. Unio. 1861, p. 221, pl. LXXIV, fig. 4.—*SOWERBY, Conch. Icon., XVI, 1866, pl. XXXVIII, fig. 206.—*CALKINS, Pr. Ottawa Ac. Sci. 1874, p. 43.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam. III, 1890, p. 161.

**Margarita* (*Unio*) *novi-eboraci* LEA Syn., 1838, p. 19.

**Margaron* (*Unio*) *novi-eboraci* LEA, Syn., 1852, p. 27; 1870, p. 60.

**Unio radiatus* DE KAY, Zool. of N. Y., Pt. 5, 1843, p. 189, pl. XVII, fig. 236.

**Unio subrostratus* KUSTER, Conch. Cab. Unio. 1861, p. 203, pl. LXVII, fig. 3.—*REEVE, Conch. Icon., XVI, 1864, pl. XVII, fig. 78.

St. Lawrence drainage; west to southern Michigan; Ohio River system; Illinois and Wisconsin.[2]

[1] Dr. Lea states in the Synopsis in the above reference that Say's *U. subrostratus* is identical with his *iris*. He is certainly mistaken.

[2] Lea places *Unio opalinus* Anthony (Am. Jl. Conch. II, 1866, p. 146, pl. VII, fig. 2) in the synonymy of the above species. It is an oval, compressed, greenish-yellow shell according to the figure and description, and seems to have been injured anteriorly. I can not tell what it is. It is credited by Anthony to Michigan.

†LAMPSILIS FATUUS Lea.[1]

* *Unio fatuus* LEA, Pr. Am. Phil. Soc., I, 1840, p. 287; *Tr. Am. Phil. Soc., VIII, 1842, p. 201, pl. XI, fig. 14; *Obs., III, 1842, p. 39, pl. XI, fig. 14.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 249.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—* CHENU, Ill. Conch., 1858, pl. XXXI, figs. 4, 4*a*, 4*b*.—* KUSTER, Conch. Cab. Unio, 1862, p. 287, pl. XCVI, fig. 5.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 152.

* *Margaron* (*Unio*) *fatuus* LEA, Syn., 1852, p. 38; 1870, p. 61.

* *Unio dactylus* LEA, Pr. Am. Phil. Soc., I, 1840, p. 287; * Tr. Am. Phil. Soc., VIII, 1842, p. 196, pl. IX, fig. 7; * Obs., III, 1842, p. 34, pl. IX, fig. 7.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 248.—* CHENU, Ill. Conch., 1858, pl. XXX, figs. 5, 5*a*, 5*b*.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *dactylus* LEA, Syn., 1852, p. 36; 1870, p. 57.

Tennessee River system. One shell from Beaver River, Pennsylvania seems to be this.

LAMPSILIS PLANICOSTATUS Lea.

Unio planicostatus LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 92; *Jl. Ac. N. Sci. Phila., IV, 1860, p. 354, pl. LIX, fig. 179; *Obs., VIII, 1860, p. 36, pl. LIX, fig. 179.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *planicostatus* LEA, Syn., 1870, p. 43.

Warren County, Kentucky; Clinch River, Tennessee; Tuscumbia, Alabama.

†LAMPSILIS NEBULOSUS Conrad.[2]

* *Unio nebulosus* CONRAD, New F. W. Shells, 1834, p. 28, pl. III, fig. 7; p. 70.—* FERUSSAC, Guer. Mag., 1835, p. 29.—*MÖLLER, Syn. Nov. Gen., 1836, p. 202.—*CHENU, Bib. Conch., 1st. ser., III, 1845, p. 16, pl. I, fig. 4.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 252.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 160.

* *Margarita Unio*) *cumberlandianus* LEA, Syn., 1836, p. 27; 1838, p. 20.

* *Margaron* (*Unio*) *cumberlandianus* LEA, Syn., 1852, p. 30.

†* *Unio cumberlandicus* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 25, pl. VII, fig. 19; *Obs., II, 1838, p. 25, pl. VII, fig. 19.—* TROSCHEL, Arch. für Naturg., V, 1839, Pt. 2, p. 235.—* HANLEY, Test. Moll., 1842, p. 191; * Biv. Shells, 1843, p. 195, pl. XXII, fig. 59.—* CATLOW and REEVE, Conch. Nom., 1845, p. 58.—*CONRAD, Pr. Ac. N.

[1] It is doubtful whether this is more than a variety of the preceding. In general, it has a rather more cylindrical shell, less rayed, and more decidedly and suddenly thickened in front than *iris*, but there are intermediate forms.

[2] After carefully comparing again and again large series of specimens, I confess that I can not possibly separate the large number of so-called species I have united under this, the oldest name. It may seem a little strange that a species should be found in the Ohio River area and Gulf drainage, but recent research has proven that a large number of our common Upper Mississippi Valley and Ohio River forms are found in the Coosa, Alabama, Black Warrior, and adjoining streams. There is some variation in the brightness of the painting of a number of these so-called species, and in the form of different specimens, but no more than is found in many other abundant, widely-distributed forms, and the figure on pl. III of the New Fresh-water Shells fairly well represents the general manifestation of the males of this species.

Sci. Phila., VI, 1853, p. 247.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* CHENU, Ill. Conch., 1858, pl. XXIV, figs. 1, 1*a*, 1*b*.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXVI, fig. 197.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 149.

* *Margaron* (*Unio*) *cumberlandicus* LEA, Syn., 1870, p. 48.

† * *Unio notatus* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 28, pl. VIII, fig. 22; * Obs., II, 1838, p. 28, pl. VIII, fig. 22.—* TROSCHEL, Arch. für Nat., V, 1839, Pt. 2, p. 235.—* HANLEY, Test. Moll., 1842, p. 193; * Biv. Shells, 1843, p. 193, pl. XXIII, fig. 9.—* CATLOW and REEVE, Conch. Nom., 1845, p. 61.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—*CHENU, Ill. Conch., 1858, pl. XXI, figs. 3, 3*a*, 3*b*.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 161.

* *Margarita* (*Unio*) *notatus* LEA, Syn., 1836, p. 26; 1838, p. 19.

* *Margaron* (*Unio*) *notatus* LEA, Syn., 1852, p. 29; 1870, p. 45.

† * *Unio glaber* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 34, pl. X, fig. 29; * Obs., II, 1838, p. 34, pl. X, fig. 29.—* TROSCHEL, Arch. für. Naturg., V, 1839, Pt. 2, p. 236.—* HANLEY, Test. Moll., 1842, p. 196; * Biv. Moll., 1843, p. 196, pl. XXIII, fig. 2.—* CATLOW and REEVE, Conch. Nom., 1845, p. 59.—* CONRAD, Pr. Ac. N. Sci., Phila., VI, 1853, p. 250.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* CHENU, Ill. Conch., 1858, pl. XXIV, figs. 3, 3*a*, 3*b*.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXV, fig. 452.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 153.

* *Margarita* (*Unio*) *glaber* LEA, Syn., 1836, p. 28; 1838, p. 20.

* *Margaron* (*Unio*) *glaber* LEA, Syn., 1852, p. 31; 1870, p. 48.

* *Unio radians* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 32; * Jl. Ac. N. Sci. Phila., IV, 1859, p. 201, pl. XXIII, fig. 84; * Obs., VII, 1859, p. 19, pl. XXIII, fig. 84.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *radians* LEA, Syn., 1870, p. 46.

† * *Unio jonesii* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 171; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 339, pl. LIV, fig. 164; * Obs., VIII, 1860, p. 21, pl. LIV, fig. 164.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch., Sam., III, 1890, p. 156.

* *Margaron* (*Unio*) *jonesii* LEA, Syn., 1870, p. 48.

† * *Unio discrepans* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 92; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 340, pl. LV, fig. 165; * Obs., VIII, 1860, p. 22, pl. LV, fig. 165.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXIV, fig. 176.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 151.

* *Margaron* (*Unio*) *discrepans* LEA, Syn., 1870, p. 48.

† * *Unio scitulus* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 93; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 342, pl. LV, fig. 167; * Obs., VIII, 1860, p. 24, pl. LV, fig. 167.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *scitulus* LEA, Syn., 1870, p. 45.

† * *Unio linguæformis* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 305; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 345, pl. LVI, fig. 170; * Obs., VIII, 1860, p. 27, pl. LVI, fig. 170.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *linguæformis* LEA, Syn., 1870, p. 48.

† * *Unio perpictus* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 306; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 350, pl. LVIII, fig. 175; * Obs., VIII, 1860, p. 32, pl. LVIII, fig. 175; * B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *perpictus* LEA, Syn., 1870, p. 44.

† * *Unio difficilis* LEA,[1] Pr. Ac. N. Sci. Phila., XII, 1868, p. 144; * Jl. Ac. N. Sci. Phila., VI, 1869, p. 311, pl. XLIX, fig. 124; * Obs., XII, 1869, p. 71, pl. XLIX, fig. 124.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *difficilis* LEA, Syn., 1870, p. 46.

[1] Two shells are in the Lea collection; one adult and badly worn, the other young, I believe it to be only a form of *nebulosus*.

† * *Unio sparus* LEA, Pr. Ac. N. Sci. Phila., XX, 1868, p. 143; * Jl. Ac. N. Sci. Phila., VI, 1868, p. 306, pl. XLVII, fig. 119; * Obs., XII, p. 66, pl. XLVII, fig. 119.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *sparus* LEA, Syn., 1870, p. 45.

Cumberland and Tennessee rivers systems, Green River, Kentucky; Tombigbee and Alabama rivers drainage; Columbus, Georgia; Wolfsville, North Carolina.

†LAMPSILIS MÜHLFELDIANUS Lea.[1]

* *Unio mühlfeldianus* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 41, pl. XII, fig. 36; * Obs., II, 1838, p. 41, pl. XII, fig. 36.—* TROSCHEL, Arch. für Naturg., V, 1839, Pt. 2, p. 236.—*HANLEY, Test. Moll., 1842, p. 195; * Biv. Shells, 1843, p. 196., pl. XXII, fig. 60.—* CATLOW and REEVE, Conch. Nom., 1845, p. 61.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 252.—* CHENU, Ill. Conch., 1858, pl. XVII, figs. 5, 5*a*, 5*b*.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXVIII, fig. 211.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 160.

**Margarita* (*Unio*) *mühlfeldianus* LEA, Syn., 1836, p. 27; 1838, p. 20.

**Margaron* (*Unio*) *mühlfeldianus* LEA, Syn., 1852, p. 30; 1870, p. 48.

Cumberland River; Watauga River near Johnson City, Tennessee.

†LAMPSILIS AMŒNUS Lea.[2]

* *Unio amœnus* LEA, Pr. Am. Phil. Soc., I, 1840, p. 286; * Tr. Am. Phil. Soc., VIII, 1842, p. 200, pl. X, fig. 12; * Obs., III, 1842, p. 200, pl. X, fig. 12.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 244.—* HANLEY, Biv. Shells, 1856, p. 386, pl. XXIV, fig. 9.—* CHENU, Ill. Conch., 1858, pl. XXXIII, figs. 5, 5*a*, 5*b*.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXIX, fig. 416.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 144.

**Margaron* (*Unio*) *amœnus* LEA, Syn., 1852, p. 29; 1870, p. 45.

Holston River, Tennessee.

†LAMPSILIS TENER Lea.[3]

* *Unio tener* LEA, Pr. Am. Phil. Soc., I, 1840, p. 286; * Tr. Am. Phil. Soc., VIII, 1840, p. 198, pl. X, fig. 10; *Obs., III, 1842, p. 36, pl. X, fig. 10.—*CATLOW and REEVE, Conch. Nom., 1845, p. 64.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 258.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* CHENU, Ill. Conch., 1858, pl. XXXI, figs. 1, 1*a*, 1*b*.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 169.

Margaron (*Unio*) *tener* LEA, Syn., 1852, p. 28; 1870, p. 44.

† * *Unio regularis* LEA, Pr. Am. Phil. Soc., II, 1841, p. 82; * Tr. Am. Phil. Soc., VIII, 1842, p. 243, pl. XXV, fig. 59; * Obs., III, 1842, p. 81, pl. XXV, fig. 59.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 256.—* CHENU, Ill. Conch., 1858, pl. XXXIII, fig. 3, 3*a*, 3*b*.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* SOWERBY,

[1] Lea has only a single specimen in his collection. I consider it a species of doubtful validity.

[2] Doubtfully valid. More regularly elliptical than *nebulosus*, and the dorsal and basal lines are more nearly parallel.

[3] I have only seen the type, a miserably eroded, broken shell, part of which is missing, but I have no doubt that it is the same thing as *regularis*.

Conch. Icon., XVI, 1868, pl. LXVIII, fig. 351.—* B. H. WRIGHT, Check List, 1888.—PÆTEL, Conch. Sam., III, 1890, p. 161.

* *Margaron* (*Unio*) *regularis* LEA, Syn., 1852, p. 29; 1870, p. 45.

Big Pigeon and French Broad rivers, Tennessee; near Bowling Green, Kentucky.

† LAMPSILIS SIMUS Lea.

* *Margarita* (*Unio*) *simus* LEA, Syn., 1836, p. 29; 1838, p. 21.

* *Unio simus* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 26, pl. VIII, fig. 20; * Obs., II, 1838, p. 26, pl. VIII, fig. 20.—* TROSCHEL, Arch. für Naturg., V, 1839, Pt. 2, p. 235.—* HANLEY, Test. Moll., 1842, p. 197; * Biv. Shells, 1843, p. 197.—* CATLOW and REEVE, Conch. Nom., 1845, p. 64.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 257.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494; * CHENU, Ill. Conch., 1858, pl. XXI, figs. 4, 4*a*, 4*b*.—* KUSTER, Conch., Cab. Unio, 1861, p. 248, pl. LXXXIII, fig. 4, p. 262, pl. LXXXVIII, fig. 3.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 167.[1]

* *Margaron* (*Unio*) *simus* LEA, Syn., 1852, p. 31; 1870, p. 50.

* *Unio notatus* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 253.

* *Unio spatulatus* SOWERBY, Conch. Icon., XVI, 1868, pl. LXV, fig. 328.

*? *Unio proximus* KUSTER, Conch. Cab. Unio, 1861, p. 248, pl. LXXXIII, fig. 4.

Cumberland and Tennessee river systems; Othcalooga Creek, northwest Georgia.

† LAMPSILIS PLANCUS Lea.[2]

* *Unio plancus* LEA, Pr. Ac. N. Sci., Phila., IV, 1860, p. 307; * Jl. Ac. N. Sci. Phila., V, 1862, p. 81, pl. X, fig. 229; * Obs., VIII, 1862, p. 85, pl. X, fig. 229.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *plancus* LEA, Syn., 1870, p. 50.

Coosa River at Wetumpka, Alabama.

(Group of *Lampsilis subangulatus*.)

Shell elliptical, inflated, subsolid, drawn to a point behind; that of the female only slightly swollen just behind the central base; bars of the beak sculpture somewhat coarse, feebly double looped; epidermis very smooth, shining, brightly rayed; teeth rather smooth, subcompressed; nacre bluish or purplish. Animal having the marsupium very large; ovisacs numerous; gills large, nearly semicircular.

LAMPSILIS SUBANGULATUS Lea.

* *Unio subangulatus* LEA, Pr. Am. Phil. Soc., I, 1840, p. 287; * Tr. Am. Phil. Soc., VIII, 1842, p. 29, pl. XIII, fig. 23; * Obs., III, 1842, p. 47, pl. XIII, fig. 23.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* CHENU, Ill. Conch., 1858, pl. XXIX, figs. 2, 2*a*, 2*b*.—* KUSTER, Conch. Cab. Unio, 1862, p. 278, pl. XCIV, fig. 2.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 168.—* SIMPSON, Pr. U. S. Nat. Mus., XVI, 1892, p. 415, pl. LVIII, fig. 1.

* *Margaron* (*Unio*) *subangulatus* LEA, Syn., 1852, p. 29; 1870, p. 45.

* *Unio fasciolus* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 249.

Appalachicola River system, Georgia and Florida.

[1] Spelled *sinus*, but no doubt intended for *simus*.

[2] Doubtfully distinct from *simus*. I have seen only the type.

† LAMPSILIS KIRKLANDIANUS S. H. Wright.[1]

* *Unio kirklandianus* S. H. Wright, Nautilus, X, 1897, p. 136.
* *Lampsilis kirklandianus* Simpson, Pr. Ac. N. Sci. Phila., 1900, p. 76, pl. 1, fig. 7.

Ocklocknee river, Leon County, Florida.

(Group of *Lampsilis ellipsiformis.*)

Shell elliptical, subinflated, pointed behind, that of the female but slightly swollen at the post base; behind this inflation there is a slight sinus; beak sculpture doubly looped, the hinder loop sometimes open behind; epidermis dull, rayed with wavy lines, generally arranged in bands; nacre white.

Animal with the marsupium colored below; gills large, inner wholly united to or only free from the abdominal sack a short distance.

† LAMPSILIS ELLIPSIFORMIS Conrad.

* *Unio ellipsiformis* Conrad, Monog., VIII, 1836, p. 60, pl. xxxiv, fig. 1.—* B. H. Wright, Check List, 1888.
* *Unio spatulatus* Lea, Pr. Am. Phil. Soc., IV, 1845, p. 164; * Tr. Am. Phil. Soc., X, 1848, p. 80, pl. viii, fig. 22; * Obs., IV, 1848, p. 54, pl. viii, fig. 22; Pr. Ac. N. Sci. Phila., VI, 1853, p. 257.—* H. and A. Adams, Gen. Rec. Moll., II, 1857, p. 495.—* Kuster, Conch. Cab. Unio, 1861, p. 261, pl. lxxxvii, fig. 7.—* Calkins, Pr. Ottawa, Ac. Sci., 1874, p. 45.—* B. H. Wright, Check List, 1888.—* Pætel Conch. Sam., III, 1890, p. 168.
* *Margaron* (*Unio*) *spatulatus* Lea.
* *Lampsilis spatulatus* Baker, Moll. Chicago, Pt. 1, 1898, p. 106, pl. x, fig. 5; xiii, fig. 2.

Upper Mississippi Valley generally; south to about latitude 38°; western New York; southern Michigan; southern Canada; Red River of the North.

† LAMPSILIS PLEASII Marsh.

* *Unio pleasii* Marsh, the Observer (a newspaper), II, May, 1891; Nautilus, V, 1891, p. 2.

Little Red River, Arkansas; Morrisville, Polk County, Missouri.

† LAMPSILIS ARKANSASENSIS Lea.

* *Unio arkansasensis* Lea, Pr. Ac. N. Sci. Phila., VI, 1862, p. 169; * Jl. Ac. N. Sci. Phila., V, 1862, p. 206, pl. xxx, fig. 275; * Obs., IX, 1863, p. 28, pl. xxx, fig. 275.—* B. H. Wright, Check List, 1888.

Hot Springs, Arkansas; Saline River near Benton, Arkansas. (Call.)

† LAMPSILIS OZARKENSIS Call.

* *Unio ozarkensis* Call, Pr. U. S. Nat. Mus., X, 1887, p. 498, pl. xxvii.—* B. H. Wright, Check List, 1888.—* Call, Tr. Ac. Sci., St. Louis, VII, 1895, p. 33, pl. xviii.

Jack's Ford of Current River, Missouri; White River, Arkansas.

[1] A lovely, brilliant little species, nearly allied to *subangulatus*, but probably distinct.

(Group of *Lampsilis trabalis.*)

Shell solid, that of the male sinuate at post base, and sometimes produced posteriorly, female shell wider, only slightly sinuous; beak sculpture rather coarse, feebly doubly looped; epidermis dark, with wavy, capillary rays; hinge heavy; nacre bluish-white or purple; animal unknown.[1]

† LAMPSILIS TRABALIS Conrad.

* *Unio trabalis* CONRAD, New F. W. Shells, May 3, 1834, p. 27, pl. III, fig. 5; p. 72.—* FERUSSAC, Guer. Mag., 1835, p. 29.—* MOLLER, Syn. Nov. Gen., 1836, p. 201.—* CONRAD, Monog., XII, 1840, p. 110, pl. LX, fig. 2.—* CHENU, Bib. Conch., 1st ser., III, 1845, p. 15, pl. II, fig. 3.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 259.—* B. H. WRIGHT, Check List, 1888.

† *Unio troostensis* LEA, Tr. Am. Phil. Soc., V, 1834 (August or September), p. 71, pl. X, fig. 30; * Obs., I, 1834, p. 183, pl. X, fig. 30.—* FERUSSAC, Guer. Mag., 1835, p. 29.—* HANLEY, Test. Moll., 1842, p. 186; Biv. Shells, 1843, p. 186, pl. XXIII, fig. 24.—CATLOW and REEVE, Conch. Nom., 1845, p. 64.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1858, p. 496.—* KUSTER Conch. Cab. Unio, 1861, p. 193, pl. LXI, fig. 4.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXVIII, fig. 406.—* P.ETEL, Conch. Sam., III, 1890, p. 170.

* *Margarita* (*Unio*) *troostensis* LEA, Syn., 1836, p. 21; 1838, p. 18.

* *Margaron* (*Unio*) *troostensis* LEA, Syn., 1852, p. 25.

* *Margaron* (*Unio*) *troostii* LEA, Syn., 1870, p. 39.

* *Unio troostii* B. H. WRIGHT, Check List, 1888.

* *Unio vanuxemensis* SOWERBY, Conch. Icon., 1866, pl. XXXIX, fig. 216.

Kentucky and streams of Tennessee: Clinch River, Virginia.

† LAMPSILIS PERPURPUREUS Lea.

* *Unio perpurpureus* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 41; * Jl. Ac. N. Sci. Phila., VI, 1866, p. 46, pl. XVI, fig. 44; * Obs., XI, 1867, p. 50, pl. XVI, fig. 44.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *perpurpureus* LEA, Syn., 1870, p. 48.

* *Unio troostensis* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXIX, fig. 415.

Tennessee River, drainage, extending into Virginia in the Clinch.

(Group of *Lampsilis modioliformis.*)

Shell elliptical, thin, quite evenly rounded before and behind, somewhat inflated; beak sculpture consisting of a few parallel bars, looped in front, and generally open; epidermis with beautiful, rather broad, generally unbroken, sometimes slightly wavy rays; nacre brilliantly iridescent posteriorly; teeth compressed. The female shell is greatly

[1] Certain male shells of *L. trabalis* differ so remarkably from those of the females and from any other known *Naiades* that it might be supposed that they belonged to an isolated group. Other male shells, however, differ but little from the females, and in *L. perpurpureus*, a species so close to *L. trabalis* that it is often difficult to separate them, the male shells differ but slightly from those of the females. Through this former species the group seems very closely related to that of *ellipsiformis*, and so on to the assemblage typified by *L. iris*.

expanded posteriorly, the outline sometimes being almost arcuate on the middle base, and sweeping around in a regular curve to the ligament. Animal with mantle border often spotted, and in the female furnished with fine, well-developed papillæ on the post-ventral region; branchial opening large, with many strong papillæ; marsupium projecting greatly below the rest of the gills, rounded below; ovisacs large and distinct.

† LAMPSILIS MODIOLIFORMIS Lea.

* *Unio modioliformis* LEA, Tr. Am. Phil. Soc., V, 1834, p. 97, pl. XIII, fig. 40; * Obs., I, 1834, p. 209, pl. XIII, fig. 40.—* FERUSSAC, Gner. Mag., 1835, p. 29.—* HANLEY, Test. Moll., 1842, p. 209; * Biv. Shells, 1843, p. 209, pl. XXIII, fig. 37.—* CATLOW and REEVE, Conch. Nom., 1845, p. 61.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—* CHENU, Man., 1859, II, p. 139, fig. 678.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 159.—* SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 414, pl. LVI, figs. 2, 3, 6.

* *Margarita* (*Unio*) *modioliformis* LEA, Syn., 1836, p. 39; 1838, p. 25.

* *Margaron* (*Unio*) *modioliformis* LEA, Syn., 1852, p. 39; 1870, p. 44.

* *Unio tenerus* RAVENEL, Cat., 1834, p. 58.[1]—* HANLEY, Test. Moll., 1842, p. 209; * Biv. Shells, 1843, p. 209.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 258.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.

* *Margarita* (*Unio*) *tenerus* LEA, Syn., 1836, p. 39; 1838, p. 25.

* *Margaron* (*Unio*) *tenerus* LEA, Syn., 1852, p. 39; 1870, p. 44.

* *Unio delumbis* KUSTER, Conch. Cab., 1861, p. 207, pl. LXIX, fig. 1.

Santee Canal, South Carolina, south to north Florida; probably west to Mississippi.

† LAMPSILIS GRACILIOR Lea.

* *Unio gracilior* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 262; * Jl. Ac. N. Sci. Phila., IV, p. 56, pl. VIII, fig. 38; * Obs., VI, p. 56, pl. VIII, fig. 38.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *gracilior* LEA, Syn., 1870, p. 45.

† * *Unio obfuscus* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 172; * Jl. Ac. N. Sci. Phila., IV, 1859, p. 197, pl. XXII, fig. 80; * Obs., VII, 1859, p. 15, pl. XXII, fig. 80.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *obfuscus* LEA, Syn., 1870, p. 45.

Near Macon, Georgia.

† LAMPSILIS VIBEX Conrad.

* *Unio vibex* Conrad, New L. and F. W. Shells, 1834, p. 31, pl. IV, fig. 3, p. 72.[2]—FERUSSAC, Guerin Mag., 1835, p. 29.—* MÖLLER, Syn. Nov. Gen., 1836, p. 203.—* HANLEY, Test. Moll., 1842, p. 198; * Biv. Shells, 1843, p. 195.—* CHENU,

[1] I am not aware that any description of Ravenel's species has ever been published. In his catalogue, he gives it this name, and refers to his manuscripts only. Specimens that he gave Dr. Lea, which are credited to him from the Santee canal in pencil on the shells, are undoubtedly *modioliformis*. Other specimens from another locality, which Lea has put with these, and has called *Unio tenerus* Ravenel, are undoubtedly *L. prevostianus* Lea. It was these latter specimens which caused me to be mistaken in the identity of *Unio tenerus* in my paper in Proceedings of the United States National Museum, XV, p. 416.

[2] One lot in the Academy of Sciences is the same as the *exiguus* of Lea, another is the same as Lea's *nashvillianus*. Conrad's figure, which is not very good, agrees fairly well with the former, but is certainly not the latter.

Bib. Conch., 1st ser., III, 1845, p. 17, pl. III, fig. 6.—* CATLOW and REEVE, Conch. Nom., 1845, p. 65.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 171.

* *Margarita* (*Unio*) *ribex* LEA, Syn., 1836, p. 27; 1838, p. 20.

* *Margaron* (*Unio*) *ribex* LEA, Syn., 1852, p. 30; 1870, p. 48.

† * *Unio exiguus* LEA, Pr. Am. Phil. Soc., I, 1840, p. 287.—* Tr. Am. Phil. Soc., VIII, 1842, p. 191, pl. VII, fig. 1; * Obs., III, 1842, p. 29, pl. VII, fig. 1.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 248.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* CHENU, Ill., Conch., 1858, pl. XXX, figs. 1, 1*a*, 1*b*.[1]—* SOWERBY, Conch. Icon., XVI, 1866, p. 38, fig. 208.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 152.

* *Margaron* (*Unio*) *exiguus* LEA, Syn., 1852, p. 27; 1870, p. 43.

† * *Unio stagnalis* CONRAD, Ann. and Mag. N. Hist., IV, 1849, p. 300; * Pr. Ac. N. Sci. Phila., IV, 1849, p. 153;[2] Jl. Ac. N. Sci. Phila., I, 1850, p. 275, pl. XXXVII, fig. 2; Pr. Ac. N. Sci. Phila., VI, 1853, p. 257.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 168.

* *Margaron* (*Unio*) *stagnalis* LEA, Syn., 1852, p. 27; 1870, p. 42.

† * *Unio rutilans* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 262; * Jl. Ac. N. Sci. Phila., IV, 1858, p. 59, pl. IX, fig. 41; * Obs., VI, 1858, p. 59, pl. IX, fig. 41.—* KUSTER, Conch. Cab. Unio, 1861, p. 258, pl. LXXXVII, fig. 3.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 166.

* *Margaron* (*Unio*) *rutilans* LEA, Syn., 1870, p. 45.

† * *Unio subellipsis* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 262; * Jl. Ac. N. Sci. Phila., IV, 1858, p. 62, pl. X, fig. 44; * Obs., VI, 1858, p. 62, pl. X, fig. 44.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *subellipsis* LEA, Syn., 1870, p. 45.

* *Unio prevostianus* SOWERBY, Conch. Icon., XVI, 1868, pl. LXIII, fig. 315.

* *Unio subangulatus* SOWERBY,[3] Conch. Icon., XVI, 1868, pl. LXV, fig. 327.

† LAMPSILIS VIBEX var. NIGRINUS Lea.[4]

* *Unio nigrinus* LEA, Tr. Am. Phil. Soc., X, 1852, p. 284, pl. XXIV, fig. 44; * Obs., V, 1852, p. 40, pl. XXIV, fig. 44.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 253.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 161.

* *Margaron* (*Unio*) *nigrinus* LEA, Syn., 1852, p. 39; 1870, p. 62.

† * *Unio floridensis* S. H. WRIGHT, Conch. Exchange, II, 1888, p. 105.

† * *Unio acerillii* B. H. WRIGHT, Pr. Ac. N. Sci. Phila., XXIII, 1888, p. 115, pl. III, fig. 2.—B. H. WRIGHT, Check List, 1888.

Ogeechee River, Georgia, west to Jackson, Mississippi; the variety in Florida, south to the Hillsborough River.

[1] Poor figures, not all accurate.

[2] This seems to be equivalent to a male *subellipsis* of Lea, of a little more solid, evenly oval or elliptical form than the type. I do not think it worthy of a varietal name, as there is every possible gradation between these shells. I formerly placed *exiguus*, *rutilans*, and *subellipsis* in the synonymy of *modioliformis* (Proc. U. S. Nat. Mus., XV, 1892, p. 414), and in a young state they seem to be exactly alike, as a general thing; but the examination of a large amount of additional material since then has led me to believe that the latter may perhaps be distinct.

[3] Probably a young specimen, rather wide at the posterior end.

[4] A smaller, shorter, fragile form, generally having a rather dark epidermis, and purplish nacre. It is a southern variety, and gradually merges into the type in the Chattahoochee region.

†LAMPSILIS DISPAR Lea.

* *Unio dispar* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 305; *Jl. Ac. N. Sci. Phila., IV, 1860, p. 327, pl. LI, fig. 153; *Obs., VIII, 1860, p. 9, pl. LI, fig. 153.—*B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *dispar* LEA, Syn., 1870, p. 45.

Southwest Georgia.

(Group of *Lampsilis amygdalum.*)

Shell rather small, obovate, inflated, epidermis varying from smooth and shining to somewhat cloth-like, ashy green to blackish, but always showing green tints when seen through transmitted light, indistinctly rayed; beaks rather high, sculptured with fine, parallel bars, arranged in a double loop, that in front being large and rounded, that behind small and rather pointed below; hinge teeth compressed; nacre iridescent behind. The greatest height of the shell is just behind the center; its greatest diameter is just in front of it, or at a point just behind the beaks; the posterior end is often pointed and somewhat raised. Animal with the marsupium large, reaching far below the inner gills, and having a black border; inner gills united to the abdominal sac throughout; anal opening smooth or only slightly crenulate.

†LAMPSILIS AMYGDALUM Lea.

Unio amygdalum LEA, Desc. of 12 sp. Uniones, Aug. 19, 1843; *Tr. Am. Phil. Soc., IX, 1846, p. 275, pl. XXXIX, fig. 1; *Obs., IV, 1848, p. 33, pl. XXXIX, fig. 1.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 244.—*H. and A. ADAMS, Gen., Rec. Moll., II, 1857, p. 492.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 144.—*SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 426, pl. LXVII, fig. 3.—*CALL, Pr. Ind. Ac. Sci., 1896, p. 115.

* *Margaron* (*Unio*) *amygdalum* LEA, Syn., 1852, p. 39; 1870, p. 62.

†* *Unio lepidus* GOULD,[1] Pr. Bost. Soc. N. Hist., VI, 1856, p. 15; Otia Conch., 1862, p. 222.—B. H. WRIGHT, Check List, 1888.—*SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 426, pl. LXVIII, fig. 1; LXIX, fig. 3.

* *Margaron* (*Unio*) *lepidus* LEA, Syn., 1870, p. 39.

Florida.

†LAMPSILIS SUDUS Lea.[2]

* *Unio concavus* LEA, Tr. Am. Phil. Soc., X, 1852, p. 260, pl. XV, fig. 11; *Obs., V, 1852, p. 16, pl. XV, fig. 11.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 247.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—*SOWERBY, Conch. Icon., XVI, 1868, pl. XCII, fig. 504.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 148.

* *Margaron* (*Unio*) *concavus* LEA, Syn., 1852, p. 29; 1870, p. 46.

†* *Unio sudus* LEA, Pr. Ac. N. Sci. Phila., IX, p. 170; *Jl. Ac. N. Sci. Phila., IV, 1859, p. 194, pl. XXI, fig. 77; *Obs., VII, 1895, p. 12, pl. XXI, fig. 77.—*B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *sudus* LEA, Syn., 1870, p. 46.

Abbeville, South Carolina.

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[1] Having carefully compared the type of this, a large specimen, with *amygdalum*, I have no doubt that both are the same species.

[2] The name *concavus* applied by Lea was, I believe, used previously by Zelebor for what seems to be *U. tumidus.*

†LAMPSILIS VESICULARIS Lea.[1]

**Unio vesicularis* LEA, Pr. Ac. N. Sci. Phila., II, 1872, p. 156; *Jl. Ac. N. Sci. Phila., VIII, 1874, p. 37, pl. XII, fig. 34; *Obs., XIII, 1874, p. 41, pl. XII, fig. 34.—*B. H. WRIGHT, Check List, 1888.—*SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 425, pl. LXVII, fig. 4.

Florida; Flint River, Georgia?

†LAMPSILIS VILLOSUS B. H. Wright.

**Unio villosus* B. H. WRIGHT, Naut., XII, 1898, p. 32.
Lampsilis villosus SIMPSON, Pr. Ac. N. Sci. Phila., 1900, p. 77, pl. I, fig. 1.

Suwanee and Escambia rivers, Florida.

†LAMPSILIS TROSSULUS Lea.[2]

Unio trossulus LEA, Desc. 12 sp. Uniones, 1843; *Tr. Am. Phil. Soc., IX, 1846, p. 278, pl. XL, fig. 6; *Obs., IV, 1848, p. 36, pl. XL, fig. 6.—*B. H. WRIGHT, Pr. Ac. N. Sci. Phila., VI, 1853, p. 259.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 496.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 170.—*SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 427, pl. LXVIII, fig. 3.
**Margaron* (*Unio*) *trossulus* LEA, Syn., 1852, p. 25; 1870, p. 39.

Lake Monroe, Florida.

†LAMPSILIS PELLUCIDUS Lea.

**Unio pellucidus* LEA, Pr. Am. Phil. Sci., IV, 1845, p. 163.—*Tr. Am. Phil. Soc., X, 1845, p. 70, pl. II, fig. 6; Obs., IV, 1848, p. 44, pl. II, fig. 6.—CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 254.—H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—B. H. WRIGHT, Check List, 1888.—PÆTEL, Conch. Sam., III, 1890, p. 162.
**Margaron* (*Unio*) *pellucidus* LEA, Syn., 1852, p. 39; 1870, p. 62.

Flint and Chattahoochee rivers, Georgia.

†LAMPSILIS MINOR Lea.

Unio minor LEA, Desc. 12 sp. Uniones, 1843; *Tr. Am. Phil. Soc., IX, 1846, p. 276, pl. XXXIX, fig. 3; *Obs., IV, 1848, p. 34, pl. XXXIX, fig. 3.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 252.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—*B. H. WRIGHT, Check List, 1888.—*SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 425, pl. LXVII, fig. 2.
**Margaron* (*Unio*) *minor* LEA, Syn., 1852, p. 31; 1870, p. 49.
**Unio stearnsii* B. H. WRIGHT, Check List, 1888.

Florida and southwestern Georgia.

†LAMPSILIS PAPYRACEUS Gould.

**Unio papyraceus* GOULD, Pr. Bost. Soc. N. Hist., II, 1845, p. 53.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 254.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857,

[1] Dr. Lea has only two specimens of this shell, both in very bad condition—dead and eroded. I have been much inclined to believe that it was a form of *L. amygdalum*, but recently a specimen in better condition submitted for my inspection by Mr. B. H. Wright would seem to show that the two are distinct.

[2] A doubtful species. The type is the only specimen I have ever seen which I can refer with any certainty to this species. It is a small, rather solid shell, and may be an unusually heavy *L. amygdalum*.

p. 492.—*GOULD, Otia. Conch., 1862, p. 197.—B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 162.—*SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 427, pl. LXVIII, fig. 2.

Margaron (Unio) papyraceus LEA, Syn. 1852, p. 38; 1870, p. 62.

Everglades, Florida.

†LAMPSILIS SINGLEYANUS Marsh.[1]

**Unio singleyanus* MARSH, Joliet Weekly News (a newspaper), May 1, 1891; *Nautilus, V, 1891, p. 29.—*SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 426, pl. LXVIII, figs. 4, 5.

Putnam and Sumpter counties, Florida.

Subgenus CARUNCULINA Simpson in Baker, 1898.[2]

(Type, *Unio texasensis* Lea.)

Shell small, inflated, obovate, rather solid, covered with a thick, dark, often cloth-like epidermis, which is rayless or only feebly rayed; beak sculpture consisting of rather strong, concentric ridges, which form, as a general thing, only a single, rounded loop in front, and are strongly curved upward behind.[3] Pseudocardinals compressed, smooth on the inside, generally reflexed upward, somewhat torn on the edges. Shell quite commonly pointed posteriorly, that of the female truncated obliquely on post base. Animal with the marsupium consisting of a few large ovisacs (8 to 13); inner gills wholly or in part free from the abdominal sac; female often having a well-developed caruncle on the mantle below the branchial opening.

†LAMPSILIS TEXASENSIS Lea.

**Unio parvus* CONRAD, Monog., II, 1836, p. 20, pl. IX, fig. 1.—*HANLEY, Biv. Shells, 1843, p. 196, pl. XXII, fig. 3.—*SOWERBY, Conch. Icon., XVI, 1866, pl. XXXV, fig. 186.

**Unio texasensis* LEA, Pr. Ac. N. Sci. Phila., VI, 1857, p. 84; *Jl. Ac. N. Sci. Phila., IV, 1860, p. 359, pl. LXI, fig. 184; *Obs., VIII, 1860, p. 41, pl. LXI, fig. 184.—*SOWERBY, Conch. Icon., XVI, 1866, pl. XL, fig. 218.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 161.—*CALL, Pr. Ind. Acad. Sci., 1896, p. III, pl. V, figs. 38–40.

**Margaron (Unio) texasensis* LEA, Syn., 1870, p. 49.

†**Unio bairdianus* LEA,[4] Pr. Ac. N. Sci. Phila., I, 1857, p. 102; *Jl. Ac. N. Sci. Phila., IV, 1860, p. 361, pl. LXI, fig. 186; *Obs., VIII, 1860, p. 43, pl. LXI, fig. 186.—*B. H. WRIGHT, Check List, 1888.

**Margaron (Unio) bairdianus* LEA, Syn., 1870, p. 49.

[1] This may belong to the *parvus* group. The beaks of specimens I have examined were badly eroded.

[2] Erroneously spelled *Corunculina*.

[3] Occasionally there is a vestige of a posterior loop, and I have seen it perfectly developed, especially in specimens of *L. haleianus*. The beak sculpture of this group is remarkably like that of the *Tetralasmus* group of Unio, though the two assemblages are not at all closely related.

[4] A rather delicate variety, but I hardly think worthy of a varietal name. The species varies from being quite slender to short, wide, and inflated.

† **Unio bealei* LEA, Pr. Ac. N. Sci. Phila., VI, 1862, p. 169; *Jl. Ac. N. Sci. Phila., V, 1862, p. 204, pl. XXX, fig. 273; *Obs., IX, 1863, p. 26, pl. XXX, fig. 273.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *bealei* LEA, Syn. 1870, p. 49.

† LAMPSILIS TEXASENSIS var. COMPRESSUS Simpson.[1]

Texas, north to Kansas; Missouri; southern Illinois and Indiana; south through Tennessee, Alabama, Mississippi, and Louisiana; the variety in southwest Texas.

† LAMPSILIS MEARNSI Simpson.

**Lampsilis mearnsi* SIMPSON, Pr. Ac. N. Sci. Phila., 1900, p. 75, pl. I, fig. 4.

Vicinity of Fort Clarke, Kinney County, Texas.

† LAMPSILIS PARVUS Barnes.

**Unio parvus* BARNES, Am. Jl. Sci., VI, 1823, pl. XIII, fig. 18 (outline).[2]—SHORT and EATON, Transylvania Journal, 1831, p. 78.—*CONRAD, New F. W. Shells, 1834, p. 70.—*SAY, Am. Conch., VI, 1834.—FERUSSAC, Guer. Mag., 1835, p. 26.—*HANLEY, Test. Moll., 1842, p. 196.—*PHILIPPI, Abbild, I, 1845, p. 19, pl. I, fig. 4.—*CATLOW and REEVE, Conch. Nom., 1845, p. 62.—*KUSTER, Conch. Cab. Unio, 1852, p. 33, pl. V, fig. 5.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 25.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 162.

**Margarita* (*Unio*) *parvus* LEA, Syn., 1836, p. 28; 1838, p. 21.

**Margaron* (*Unio*) *parvus* LEA, Syn., 1852, p. 31; 1870, p. 49.

**Lampsilis parvus* BAKER, Moll. Chicago, Pt 1, 1898, p. 109, pl. XIII, fig. 3.

**Mya parva* EATON, Zool. Text-Book, 1826, p. 222.

Mississippi River drainage generally; southwest to central Texas; western New York; southern Canada; and Michigan doubtfully.

† LAMPSILIS HALEIANUS Lea.[3]

**Unio haleianus* LEA, Pr. Am. Phil. Soc., II, 1842, p. 224; *Tr. Am. Phil. Soc., VIII, 1842, p. 247, pl. XXVII, fig. 63; *Obs., III, 1842, p. 85, pl. XXVII, fig. 63.—CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 250.—*H. and A. ADAMS, Gen., Rec. Moll., II, 1857, p. 494.—*CHENU, Ill. Conch., 1858, pl. XXVI, figs. 6, 6*a*, 6*b*.—*? REEVE, Conch. Icon., XVI, 1865, pl. XXIV, fig. 116.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 154.

**Margaron* (*Unio*) *haleianus* LEA, Syn., 1852, p. 31; 1870, p. 49.

Alexandria, Louisiana; eastern Texas.

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[1] A remarkably compressed elevated form from southwest Texas may bear this name.

[2] Barnes's outline shows a small shell, *evenly rounded posteriorly*. I believe that this character of being rounded behind is constant, and is the only one by which it always differs from its near ally, *L. texasensis*, which is more sharp behind and usually obliquely truncate at the post-base. The two species have been continually confounded, and even Dr. Lea has placed in his collection under the name *parvus* a number of specimens which I am sure are his *texasensis*. The former is generally the smaller of the two, though not always, as in northern Illinois it sometimes reaches a length of 2 inches. *L. texasensis* undoubtedly ranges north into northern Missouri, southern Illinois and Indiana, and the true *parvus* is occasionally found well down into Texas.

[3] This is often confounded with *L. texasensis*. It is a larger, thinner-shelled form, and is not so decidedly truncate at the post-basal region.

†LAMPSILIS GLANS Lea.

**Unio glans* LEA, Tr. Am. Phil. Soc., 1834, p. 82, pl. VIII, fig. 12; *Obs., I, 1834, p. 92, pl. VIII, fig. 12.—* CONRAD, New F.W. Shells, 1834, p. 69.—* FERUSSAC, Guerin Mag., 1835, p. 26.—* CONRAD, Monog., II, 1836, p. 21, pl. IX, fig. 2.—* HANLEY, Test. Moll., 1842, p. 196; Biv. Shells, 1843, p. 196, pl. XXII, fig. 33.—* CATLOW and REEVE, Conch. Nom., 1845, p. 59.—* KUSTER, Conch. Cab. Unio, 1852, p. 37, pl. VI, fig. 3.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 250.—* CHENU, Ill. Conch., 1858, pl. VIII, figs. 9, 9*a*, 9*b*.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—*SOWERBY, Conch. Icon., XVI, 1866, pl. XXXVI, fig. 190.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 154.

**Margarita* (*Unio*) *glans* LEA, Syn., 1836, p. 28; 1838, p. 21.

**Margaron* (*Unio*) *glans* LEA, Syn., 1852, p. 31; 1870, p. 49.

Ohio River drainage; Warsaw, Indiana; (probably St. Lawrence drainage) southern Michigan; White River, Carroll County, Arkansas (Call).

†LAMPSILIS GERMANUS Lea.

**Unio germanus* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 40; *Jl. Ac. N. Sci. Phila., VI, 1866, p. 49, pl. XIX, fig. 54; *Obs., XI, 1867, p. 53, pl. XIX, fig. 54.—* B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *germanus* LEA, Syn., 1870, p. 49.

† **Unio granulatus* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 60; *Jl. Ac. N. Sci. Phila., VI, 1866, p. 48, pl. XVI, fig. 46; * Obs., XI, 1867, p. 52, pl. XVI, fig. 46.—* B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *granulatus* LEA, Syn., 1870, p. 49.

Coosa River, and Big Prairie Creek, Alabama.

†LAMPSILIS CYLINDRELLUS Lea.

**Unio cylindrellus* LEA, Pr. Ac. N. Sci. Phila., XII, 1868, p. 144; *Jl. Ac. N. Sci. Phila., VIII, 1869, p. 308, pl. XLVIII, fig. 121.—* Obs., XII, 1869, p. 68, pl. XLVIII, fig. 121.—* B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *cylindrellus* LEA, Syn., 1870, p. 49.

Tennessee River drainage.

†LAMPSILIS MŒSTUS Lea.[1]

**Unio mœstus* LEA, Pr. Am. Phil. Soc., II, 1841, p. 82; * Tr. Am. Phil. Soc., VIII, 1842, p. 244, pl. XXVI, fig. 60; * Obs., III, 1842, p. 82, pl. XXVI, fig. 60.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 252.—* CHENU, Ill. Conch., 1858, pl. XXVIII, figs. 3, 3*a*, 3*b*.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* KUSTER, Conch. Cab. Unio, 1861, p. 226, pl. LXXVI, fig. 5.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 159.

**Margaron* (*Unio*) *mœstus* LEA, Syn., 1852, p. 31; 1870, p. 49.

French Broad River, Tennessee.

†LAMPSILIS CROMWELLII Lea.

**Unio Cromwellii* LEA, Pr. Ac. N. Sci. Phila., IX, 1865, p. 89; Jl. Ac. N. Sci. Phila., VI, 1869, p. 258, pl. XXXI, fig. 73; Obs., XII, 1869, p. 19, pl. XXXI, fig. 73.—B. H. WRIGHT, Check List, 1888.

[1]The only shells I have seen of this are two in the Lea collection, having quite solid, stumpy teeth. They are old, dead, and a little worn, and in such a condition that it is hard to tell much about them. The species may be a large *cylindrellus*, but I can not be sure that they are.

**Margaron* (*Unio*) *cromwellii* LEA, Syn., 1870, p. 49.

†*Unio marginis* LEA, Pr. Ac. N. Sci. Phila., 1865, p. 89; *Jl. Ac. N. Sci. Phila., VI, 1869, p. 225, pl. XXXI, fig. 69; * Obs., XII, 1869, p. 15, pl. XXXI, fig. 69.—* B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *marginis* LEA, Syn., 1870, p. 49.

Western Georgia and southeastern Alabama.

† LAMPSILIS CORVUNCULUS Lea.

**Unio corvunculus* LEA, Pr. Ac. N. Sci. Phila., XII, 1868, p. 144; *Jl. Ac. N. Sci. Phila., VI, 1869, p. 314, pl. L, fig. 127; * Obs., XII, 1869, p. 74, pl. L, fig. 127.—* B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *corvunculus* LEA, Syn., 1870, p. 49.

Western Georgia; Village Creek, Jefferson County, Alabama; Lake Ashby, Florida.

† LAMPSILIS PAULUS Lea.

**Unio paulus* LEA, Pr. Am. Phil. Soc., 1840, p. 287; * Tr. Am. Phil. Soc., VIII, 1842, p. 213, pl. XV, fig. 29; * Obs., III, 1842, p. 51, pl. XV, fig. 29.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 254.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* CHENU, Ill. Conch., 1858, pl. XXVII, figs. 5, 5*a*, 5*b*.—* KUSTER, Conch. Cab. Unio, 1861, p. 260, pl. LXXXVII, fig. 6.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 162.

**Margaron* (*Unio*) *paulus* LEA, Syn., 1852, p. 31; 1870, p. 49.

†**Unio corvinus* LEA, Pr. Ac. N. Sci. Phila., XII, 1868, p. 144; *Jl. Ac. N. Sci. Phila., VI, 1869, p. 310, pl. XLVIII, fig. 123; * Obs., XII, 1869, p. 70, pl. XLVIII, fig. 123.—* B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *corvinus* LEA, Syn., 1870, p. 49.

Flint and Chattahoochee rivers, Georgia.

LAMPSILIS PULLUS Conrad.[1]

**Unio pullus* CONRAD, Monog., XI, 1838, p. 100, pl. LIV, fig. 2; * Proc. Acad. Nat. Sci. Phila., VI, 1853, p. 255.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* KUSTER, Conch. Cab. Unio, 1862, p. 270, pl. XCI, fig. 2.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 164.

**Margaron* (*Unio*) *pullus* LEA, Syn., 1852, p. 31; 1870, p. 49.

Warm Springs, North Carolina.

Subgenus PROPTERA Rafinesque, 1819.

(Type, *Unio alatus* Say.)

Shell usually large, gaping at the anterior base and edge of dorsal slope, winged along the dorsal region when young and often when adult; beak sculpture feeble, consisting, when developed, of an anterior and posterior loop, the former often wanting; the latter sometimes becomes slightly nodulous; epidermis generally brown, often cloth-like when fresh, rayless or feebly rayed; teeth rather compressed, pseudocardinals

[1] Conrad's figure is a poor one, and I can not be positive just where the species should be placed, but incline to think it a member of the *Texasensis* group. Lea has a shell which he calls the *pullus* of Conrad, which came from Ravenel, labeled "S. Carolina," but which, I think, is not this, but some species of the *subrostratus* group. It is quite probable that *pullus* is the same as Lea's *corvunculus*.

frequently imperfect or nearly wanting; laterals remote; anterior muscle scars often complicated; dorsal scars consisting of a row of from four to thirty distinct, often deep impressions, running from the cavity of the beak obliquely downward anteriorly; nacre purplish. Animal with large branchiæ; marsupium consisting of numerous, generally fine ovisacs, which are often somewhat radial; mantle thickened and distinctly double on the border, often papillose behind where the outer fold develops into a thickened flap; branchial opening with irregular teeth; anal opening smooth or only slightly crenulate.

(Group of *Lampsilis alatus*.)

Shell obovate, strongly winged, subsolid, with a slight posterior and superposterior ridge; epidermis thick, dark, showing irregular growth lines; hinge teeth generally well developed; nacre dark purple, female shell greatly developed in post-basal region. Animal with very numerous and fine ovisacs; marsupium large; inner gills united to abdominal sac throughout.

† LAMPSILIS ALATUS Say.

Unio alatus SAY, Nich. Encyc., II, 1816, pl. IV, fig. 2.—* HILDRETH, Am. Jl. Sci., XIV, 1828, p. 285, fig. 17.—* SAY, Am. Conch., VI, 1834.—* CONRAD, New F. W. Shells, 1834, p. 67; Monog., VII, 1836, p. 57, pl. XXXI.—* SOWERBY, Conch. Man., 1839, fig. 147.—* ANTON, Verz. der Conch., 1839, p. 14.—* REEVE, Conch. Syst., I, 1841, p. 118, pl. LXXXIX, fig. 8.—* C. B. ADAMS, Thompson's History of Vermont, 1842, p. 166, fig.; * L. and F. W. Shells of Vermont, 1842, p. 16, fig.—* HANLEY, Test. Moll., 1842, p. 174; * Biv. Shells, 1843, p. 174.—* DE KAY, Zool. of N. Y., Pt. 5, 1843, p. 195.—* POTIEZ and MICHAUD, Gall. Moll., 1844, p. 146, pl. LVI, fig. 2.—* CATLOW and REEVE, Conch. Nom., 1845, p. 55.—* KUSTER, Conch. Cab., 1852, p. 15, pl. I, fig. 1.—* DEWEY, Ninth Rep. N. Y. Cab. Nat. Hist., 1856, p. 32.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 498.—* CHENU, Man., 1859, II, p. 143, fig. 708.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XLIV, fig. 242.—* CALKINS, Pr. Ottawa Ac. N. Sci., 1874, p. 41.—* LATCHFORD, Tr. Ottawa F. N. Club, 1882, p. 52.—* B. H. WRIGHT, Check List, 1888.—* PETEL, Conch. Sam., III, 1890, p. 144.

* *Margarita* (*Unio*) *alatus* LEA, Syn., 1836, p. 11; 1835, p. 13.

* *Margaron* (*Unio*) *alatus* LEA, Syn., 1852, p. 19; 1870, p. 28.

* *Lampsilis alatus* BAKER, Moll. Chicago, Pt. 1, 1898, p. 97, pl. XVIII.

* *Unio alata* LAMARCK, An. sans Vert., VI, 1819, p. 76.—* DESHAYES, Encyc. Meth., II, 1830, p. 583; * An. sans Vert., 2d ed., VI, 1835, p. 539; 3d ed., II, 1839, p. 669.

* *Mya alata*, EATON, Zool. Text-Book, 1826, p. 219.—* WOOD, Index Test. (Rev.), 1856, p. 199, pl. 1, supp. fig. 3.

* *Symphynota alata* LEA, Tr. Am. Phil. Soc., III, 1830, p. 448; * Obs., 1834, I, p. 62.—SHORT and EATON, Transylvania Jl., 1831, p. 80.—* FERUSSAC, Guer. Mag., 1835, p. 25.

* *Lymnadia alata* SWAINSON, Treat. on Mal., 1840, p. 265, fig. 48; * Exotic Conch., 2d ed., 1841, p. 38, pl. VII.

* *Mysca alata* SWAINSON, Exotic Conch., 2d ed., 1841, p. 28, pl. VII.

* *Metaptera alata* STIMPSON, Shells of N. Eng., 1851, p. 14.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 260.

*? *Metaptera metaptera* RAFINESQUE, Ann. Gen. Sci., Brux, V, 1820, p. 300, pl. LXXX, figs. 20–22.—* CHENU, Bib. Conch., 1st ser., III, 1845, p. 15, pl. I, figs. 20–22.

†LAMPSILIS ALATUS var. POULSONI Conrad.

* *Unio poulsoni* CONRAD, New F. W. Shells, 1834, p. 25, pl. I, p. 71.—* MÖLLER, Syn. Nov. Gen., 1836, p. 200.—* CHENU, Bib. Conch., 1st ser., III, 1845, p. 15, pl. I, fig. 7.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 164.

* *Symphynota poulsoni* FERUSSAC, Guer. Mag., 1835, p. 25.

* *Unio inflatus* CONRAD, Monog., VII, 1836, p. 57, pl. XXXII.[1]

Entire Mississippi drainage as far south as Arkansas; St. Lawrence drainage; Red River of the North; the variety in the Alabama and Tombigbee systems.

†LAMPSILIS COLORADOENSIS Lea.

* *Unio coloradoensis* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 103; * Jl. Ac. N. Sci. Phila., III, 1858, p. 314, pl. XXXI, fig. 29; * Obs., VI, 1857, p. 34, pl. XXXI, fig. 29.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *coloradoensis* LEA, Syn., 1870, p. 41.

Eastern Texas.

†LAMPSILIS ROVIROSAI Pilsbry.

* *Unio* (*Lampsilis*) *rovirosai* PILSBRY, Nautilus, XIII, 1900, p. 140.

Laguna de Atasta, near San Juan Bautista, Mexico.

†LAMPSILIS PURPURATUS Lamarck.

* *Unio purpurata* LAMARCK, An. sans Vert., VI, 1819, p. 71.—* STARK, Nat. Hist., II, 1828, p. 90.—* DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 533; 3d ed., II, 1839, p. 667.

* *Unio purpuratus* LEA, Obs., I, 1834, p. 199.—* FERUSSAC, Guer. Mag., 1835, p. 26.—* HANLEY, Test. Moll., 1842, p. 208; * Biv. Shells, 1843, p. 208, pl. XXII, fig. 5.—* CATLOW and REEVE, Conch. Nom., 1845, p. 63.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 255.—* KUSTER, Conch. Cab. Unio, 1861, p. 185, pl. LIX, fig. 1.—* REEVE, Conch. Icon., XVI, 1865, pl. XXIV, fig. 115.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 164.—* PILSBRY, Nautilus, V, 1891, p. 76.—* CALL, Tr. Ac. Sci. St. Louis, VII, No. 1, 1895, p. 38, pl. V.

* *Margarita* (*Unio*) *purpuratus* LEA, 1836, p. 39; 1838, p. 25.

* *Margaron* (*Unio*) *purpuratus* LEA, Syn., 1852, p. 38; 1870, p. 61.

† *Unio ater* LEA, Tr. Am. Phil. Soc., III, 1830, p. 426, pl. VII, fig. 9; * Obs., I, 1834, p. 40, pl. VII, fig. 9.—* CONRAD, New F. W. Shells, 1834, p. 67.—* CHENU, Ill. Conch., 1858, pl. X, figs. 1*a*, 1*b*.

Unio atra DESHAYES, Enc. Meth., II, 1830, p. 582.

* *Unio lugubris* SAY, Am. Conch., V, 1832, pl. XLIII; VI, 1834.

* *Unio poulsoni* SOWERBY, Conch. Icon., XVI, 1866, pl. LI, fig. 270.

* *Unio dolosus* LEA,[2] Pr. Ac. N. Sci. Phila., IV, 1860, p. 307; * Jl. Ac. N. Sci. Phila., V, 1862, p. 75, pl. IX, fig. 224; * Obs., VIII, 1862, p. 79, pl. IX, fig. 224.—* SOW-

[1] The variety *poulsoni* is narrower anteriorly and more drawn at the post-basal point than the type, and this form is common in the streams that drain into the Gulf east of the Mississippi, but it seems to connect with typical *alatus* in Tennessee.

[2] A miserable, worn, young specimen of what I am quite sure is *L. purpuratus*. Lea states that the embryos of this are pouch-shaped, while those of *purpuratus* are wedge-shaped, but the form of embryos in a given species is often not constant.

ERBY, Conch. Icon., XVI, 1866, pl. XLI, fig. 228.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 151.

* *Margaron* (*Unio*) *dolosus* LEA, Syn., 1870, p. 61.

Eastern Texas, north to Kansas, through southern Missouri, western Tennessee, to the Alabama River drainage.

†LAMPSILIS PERMISCENS Lea.[1]

* *Unio permiscens* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 112; *Jl. Ac. N. Sci. Phila., V, 1862, p. 102, pl. XVII, fig. 251; * Obs., VIII, 1862, p. 106, pl. XVII, fig. 251.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *permiscens* LEA, Syn., 1870, p. 61.

Tombigbee River, Columbus, Mississippi.

†LAMPSILIS GOULDII Lea.[2]

* *Unio gouldii* LEA, Pr. Am. Phil. Soc., IV, 1845, p. 165; * Tr. Am. Phil. Soc., X, 1848, p. 76, pl. VI, fig. 16; * Obs., IV, 1848, p. 50, pl. VI, fig. 16.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 250.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 153.

* *Margaron* (*Unio*) *gouldii* LEA, Syn., 1852, p. 29; 1870, p. 46.

Tuscaloosa, Alabama.

(Group of *Lampsilis saladoensis*.)

Shell smooth, obovate, inflated, inequilateral, rounded behind, thin, slightly thicker in front; beaks somewhat prominent, nearly smooth; epidermis yellowish olive, shining, rayed; there is a slight carina high up on the posterior slope; pseudocardinals small, lamellar, and oblique; laterals lamellar and curved; anterior cicatrices distinct and well impressed; posterior cicatrices confluent; dorsal cicatrices under the plate, between the pseudocardinals and laterals; nacre bluish white and iridescent.[3] Animal unknown.

LAMPSILIS SALADOENSIS Lea.

* *Unio saladoensis* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 305; *Jl. Ac. N. Sci. Phila., IV, 1860, p. 370, pl. LXV, fig. 195; * Obs., VIII, 1860, p. 52, pl. LXV, fig. 195.—B. H. WRIGHT, Check List, 1888.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 586.

* *Margaron* (*Unio*) *saladoensis* LEA, Syn., 1870, p. 62.

Rio Salado, New Leon, Mexico.

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[1] There is only a single, young, poor specimen in the Lea collection, which may be a valid species, but is quite likely a *L. purpuratus*.

[2] Only a single, dead, badly worn shell is in Lea's collection. It is something like a young *umbrosus*, but if it really came from Tuscaloosa, Alabama, it probably belongs to the *Alatus* group. I can not decide certainly as to its affinities.

[3] Mr. Lea states that a single specimen of *U. saladoensis* was collected by Dr. Berlandier and presented to the Smithsonian Institution by Lieutenant Couch (Obs. VIII, p. 53). I have never found this shell, and have not seen the species, and am somewhat at a loss as to where to place it, but the figure and description would indicate that it is a young shell of a form related to *purpuratus;* its rays, which Dr. Lea says are nearest to *U. amygdalum*, being different from those of any related forms.

(Group of *Lampsilis umbrosus*.)

Shell solid, inflated, short-elliptical, covered with a shining, rather smooth brownish epidermis which often has microscopic, radiating folds; beak sculpture excessively faint, being the merest hint at a double loop; anterior end of the shell suddenly thickened, that of the male scarcely differing from the female; hinge teeth well developed; pseudocardinals strong; laterals large, straight, and club-shaped, nacre whitish or purplish. Animal with the inner gills united to the abdominal sac; branchiæ large; marsupium occupying the whole outer gills posteriorly, not projecting much below; palpi large, considerably united behind.

†LAMPSILIS UMBROSUS Lea.

* *Unio umbrosus* LEA, Pr. Ac. N. Sci. Phila , VIII, 1856, p. 95; *Jl. Ac. N. Sci. Phila., III, 1857, p. 311, pl. XXX, fig. 26; * Obs., VI, 1857, p. 31, pl. XXX, fig. 26.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXIII, fig. 170.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 171.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 587, pl. LXVII, figs. 1, 1*a*, 1*b*.

* *Margaron* (*Unio*) *umbrosus* LEA, Syn., 1870, p. 41.

† *Unio veracruzensis* LEA, Pr. Ac. N. Sci. Phila., XII, 1868, p. 150; *Jl. Ac. N. Sci. Phila., VI, 1869, p. 320, pl. LII, fig. 133; * Obs., XII, 1869, p. 80, pl. LII, fig. 133.—* B. H. WRIGHT, Check List, 1888.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 605.

* *Margaron* (*Unio*) *veracruzensis* LEA, Syn., 1870, p. 45.[1]

Vera Cruz, Mexico.

†LAMPSILIS BERLANDIERI Lea.[2]

* *Unio berlandierii* LEA, Pr. Ac. Phila., I, 1857, p. 101; *Jl. Ac. N. Sci. Phila., IV, 1860, p. 369, pl. LXV, fig. 194; * Obs. VIII, 1860, p. 51, pl. LXV, fig. 194.—* REEVE, Conch. Icon., XVI, 1865, pl. XXIII, fig. 108.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam. III, 1890, p. 146.—* PILSBRY, Naut. V, 1891, p. 76.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 584.

* *Margaron* (*Unio*) *berlandierii* LEA, Syn., 1870, p. 36.

Northeastern Mexico; southwestern Texas.

†LAMPSILIS TAMPECOENSIS Lea.

* *Unio tampecoensis* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 24, pl. VII, fig. 18; * Obs., II, 1838, p. 24, pl. VII, fig. 18.—* TROSCHEL, Arch. für Naturg., V, 1839, Pt. 2, p. 235.—* HANLEY, Test. Moll., 1842, p. 188; * Biv. Shells, 1843, p. 188.—* CATLOW and REEVE, Conch. Nom., 1845, p. 64.—* CONRAD, Pr. Ac. N. Sci. Phila., VI,

[1] The type of *veracruzensis* is in the Smithsonian collection, and is undoubtedly a very young *umbrosus*.

[2] This species is extremely close to *L. tampecoensis*, and at one time I believed the two to be mere forms of the same thing. The present species is typically heavier and more inflated, as well as lighter colored, and has higher beaks than the latter. According to Hon. J. D. Mitchell, of Victoria, Texas, who has carefully studied these forms when living, *berlandieri* is more active, and while spawning it only buries itself sufficiently to be steady and give the post-ventral portion an elevation, while *tampecoensis* is sedentary in its habits, and buries itself entirely, excepting the extreme posterior point. Letter of Septemb r 25, 1895.

1853, p. 258.—* CHENU, Ill. Conch., 1858, pl. XXI, figs. 5, 5*a*, 5*b*.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—*? KUSTER, Conch. Cab. Unio., 1862, p. 275, pl. XCIII, fig. 1.—*? SOWERBY, Conch. Icon., XVI, 1867, pl. LVII, fig. 291.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 169.—* FISCHER and CROSSE, Miss. Sci. Pt. 7, II, 1894, p. 586.[1]

* *Margarita* (*Unio*) *tampecoensis* LEA, Syn., 1836, p. 22; 1838, p. 18.

* *Margaron* (*Unio*) *tampecoensis* LEA, Syn., 1852, p. 26; 1870, p. 41.

* *Unio heermannii* LEA, Pr. Ac. N. Sci. Phila., XIII, 1861, p. 392; * Jl. Ac. N. Sci. Phila., V, 1862, p. 194, pl. XXVI, fig. 263; * Obs. IX, 1863, p. 16, pl. XXVI, fig. 263.—*? SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXIII, fig. 441.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 154.

* *Margaron* (*Unio*) *heermannii* LEA, Syn., 1870, p. 28.[2]

Northeastern Mexico; southeastern Texas; Honduras.

†LAMPSILIS TECOMATENSIS Lea.

* *Unio tecomatensis* LEA, Pr. Am. Phil. Soc., II, 1841, p. 30; * Tr. Am. Phil. Soc., VIII, 1842, p. 234, pl. XXI, fig. 48; * Obs., III, 1842, p. 72, pl. XXI, fig. 48.—CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 258.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* CHENU, Ill. Conch., 1858, pl. XXXI, figs. 6, 6*a*, 6*b*.—* B. H. WRIGHT, Check List, 1888.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 589, pl. LXV, fig. 6; LXVI, figs. 4, 4*a*.

* *Margaron* (*Unio*) *tecomatensis* LEA, Syn., 1852, p. 27; 1870, p. 50.

Tecomata River, Mexico.

LAMPSILIS LIVIDUS Simpson.[3]

* *Unio testudineus* REEVE, Conch. Icon., XVI, 1865, pl. XXII, fig. 101.

* *Unio explicatus* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 594.

Rio Usumasinto, Portugal, according to Reeve, who no doubt intended this for Rio Usumasinta, Mexico, and Guatemala.

† LAMPSILIS EXPLICATUS Morelet.

* *Unio explicatus* MORELET, Test. Noviss, Pt. 1, 1849, p. 28.[4]—FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 594, pl. LXI, fig. 1.

* *Margaron* (*Unio*) *semigranosus* LEA, Syn., 1870, p. 34.

Central America.

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[1] Fischer and Crosse (see above citation) doubt whether Sowerby's figures in Conch. Icon. and Kuster's in Conch. Cab. are *tampecoensis*. Though not very accurate figures, I can not refer them equally well to any other species.

[2] Lea has two specimens of *heermanni* in his collection; the type, which is a young, slightly injured shell, and a very young one. I am certain it is only *tampecoensis*.

[3] Reeve described and figured this form in the Conchologia, supposing it to be the *testudineus* of Morelet, which is a very different thing. Fischer and Crosse in Mission Scientifique, believing it to be equal to Morelet's *explicatus*, placed it in the synonymy of that species. I have never seen an absolutely authentic specimen of *explicatus*, but if Fischer and Crosse have accurately figured and described it, I am sure it is different from Reeve's species, the latter being evidently more inflated, smoother, differently shaped, and having a great deal higher beaks. This being the case, it becomes necessary to give Reeve's shell a new name. Fischer and Crosse credit the species to Sowerby, but the Plate XXII, in the Conchologia, is credited to Reeve.

[4] A single valve of what is probably this species was received by the United States National Museum from Dr. H. von Ihering, under the name of *Unio explicatus* Morelet.

LAMPSILIS ALIENIGENUS Crosse and Fischer.

* *Unio alienigenus* CROSSE and FISCHER, Jl. de Conch., XLI, 1893, p. 294.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 590, pl. LXV, figs. 5, 5*a*; LXVI, fig. 3.

Goatzalcoalcos, Vera Cruz, Mexico.[1]

(Group of *Lampsilis aztecorum.*)

Shell elliptical, oblong, rounded in front and behind, the posterior part being slightly compressed, the whole rather thin; umbonal region inflated; beak sculpture unknown; epidermis brown and rather smooth; pseudocardinals small, laterals curved; nacre purple and shining; female shell (the specimen figured) somewhat swollen in post basal region, so that the basal line is slightly incurved.

Animal unknown.

LAMPSILIS AZTECORUM Philippi.

* *Unio aztecorum* PHILIPPI, Zeits. für Mal., IV, 1847, p. 95; *Abbild., III, 1849, p. 109, pl. VI, fig. 2.—* KUSTER, Conch. Cab. Unio, 1862, pp. 2, 84, pl. XCV, fig. 6.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 145.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 607.

* *Margaron* (*Unio*) *aztecorum* LEA, Syn., 1870, p. 44.

(Group of *Lampsilis metallicus.*)

Shell rather small, obovate-rhomboid, inflated, much narrowed and rounded in front, the form approaching that of a *Modiolus;* epidermis a rich coppery bronze, shining; beak sculpture consisting of two faint, rounded loops, the bars of which are inclined to be nodulous; pseudocardinals compressed, not well developed, and sometimes more or less broken into denticles; laterals distinct; pits in the beak cavity numerous and very irregular; nacre dark, coppery to purple, with metallic tints, iridescent behind. Animal unknown.

† LAMPSILIS METALLICUS Say.

Unio metallicus SAY, N. Harm., Disseminator (newspaper form), January 15, 1831; *Am. Conch., VI, 1834.—* CONRAD, New F. W. Shells, 1834, p. 70.—* FERUSSAC, Guer. Mag., 1835, p. 29.—* L. SAY, New Terr. and Fluv. Shells, 1840, p. 6.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 252.—* PÆTEL, Conch. Sam., III, 1890, p. 159.

†* *Unio cuprinus* LEA, Tr. Am. Phil. Soc., IV, 1831, p. 94, pl. XII, fig. 24;[2] * Obs., I, 1834, pl. XII, fig 24.—* HANLEY, Test. Moll., 1842, p. 208; * Biv. Shells, 1843, p. 208, pl. XXII, fig. 7.—* CATLOW and REEVE, Conch. Nom., 1845, p. 58.—* CHENU, Ill. Conch., 1858, pl. XI, figs. 3, 3*a*, 3*b*.—* H. and A. ADAMS, Gen. Rec. Moll.,

[1] I am considerably in doubt as to the relationship of the last two species. Fischer and Crosse are sure that *alienigenus* is close to *umbrosus*, and their figure and description seem to show that *explicatus* is near to *alienigenus*.

[2] The Transactions of the Philosophical Society, IV, in which Mr. Lea published his *Unio cuprinus*, which is identical with Mr. Say's species, was issued, according to Scudder, in the latter end of 1831.

II, 1857, p. 492.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXVI, fig. 336.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 149.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 615.

**Margarita* (*Unio*) *cuprinus* LEA, Syn., 1836, p. 39; 1838, p. 25.

**Margaron* (*Unio*) *cuprinus* LEA, Syn., 1852, p. 38; 1870, p. 61.

* *Unio aereus* REEVE, Conch. Icon., XVI, 1856, pl. XXX, fig. 160.[1]—* PÆTEL, Conch. Sam., III, 1890, p. 144.

Mexico.

(Group of *Lampsilis gracilis*.)

Shell large, thin, elliptical or slightly obovate, with a high posterior and an anterior wing, not greatly inflated; beaks low; epidermis rather smooth, often feebly rayed, dull colored, but usually glossy; hinge line slightly and rather regularly curved; teeth compressed, pseudocardinals but feebly and often imperfectly developed; nacre purplish tinted, rather dull. Shell of the male and female nearly alike, the latter scarcely swollen at post basal region. Animal with the mantle greatly thickened at posterior end, and double and thickened at post base, where it is often crenulate or toothed on its inner border, and has the outer developed into a flap; inner gill united to the abdominal sac throughout; marsupium enormous, composed of a great number of delicate semiradiating ovisacs, projecting far below the inner gills in a semicircle.

†LAMPSILIS GRACILIS Barnes.

* *Unio gracilis* BARNES, Am. Jl. Sci., VI, 1823, p. 274.—* HILDRETH, Am. Jl. Sci., XIV, 1828, p. 288.—* DESHAYES, An. sans Vert, 2d ed., VI, 1835, p. 559; 3d ed., II, 1839, p. 676; Tr. Element. Conch, 1839, p. 18, pl. XXX, figs. 2, 3.—* HANLEY, Test. Moll., 1842., p. 174.—* C. B. ADAMS, Thompson's Hist. Vermont, 1842, p. 166; * F. W. and L. Shells of Vermont, 1842, p. 16.—* HANLEY, Biv. Shells, 1843, p. 174, pl. XX, fig. 37.—* CATLOW and REEVE, Conch. Nom., 1845, p. 59.—* DESHAYES, Tr. Elem., II, 1853, p. 217, pl. XXX, figs. 2, 3.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 498.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXIX, fig. 215.—* CALKINS, Pr. Ottawa Ac. Sci., 1874, p. 42.—* LATCHFORD, Tr. Ottawa F. Nat. Club., 1882, p. 52.—* B. H. WRIGHT, Check List, 1888.

**Mya gracilis* EATON, Zool. Text Book, 1826, p. 222.

* *Symphynota gracilis* LEA, Tr. Am. Phil. Soc., III, 1830, p. 452.—SHORT and EATON, Transylvania Jl., 1831, p. 80.—* LEA, Obs., I, 1834, p. 66.

**Margarita* (*Unio*) *gracilis* LEA, Syn., 1836, p. 11; 1838, p. 13.

* *Metaptera gracilis* STIMPSON, Shells of N. Eng., 1851, p. 14.

* *Margaron* (*Unio*) *gracilis* LEA, Syn. 1852, p. 19; 1870, p. 28.

* † *Anodon gracilis* SOWERBY, Genera, No. XVII, 1823, fig.

* *Lampsilis gracilis* BAKER, Moll. Chicago, Pt. 1, 1898, p. 99, pl. XIX, fig. 1.

* *Unio fragilis* SWAINSON, Zool. Ill., 1st ser., III, pl. CLXXI, 1823.[2]—* DESHAYES, Encyc. Meth., II, 1830, p. 587.—* SAY, Am. Conch., VI, 1834.—* CONRAD, New F. W. Shells, 1834, p. 69; * Monog., VI, 1836, p. 55, pl. XXX.—* CHENU, Bib.

[1] The description of the plate is dated 1856, and in the contents it is credited to Reeve, although the previous plates bear date of 1865, and those following 1866.

[2] Swainson's *Unio fragilis* was published about the same time as Barnes's *gracilis*, and as it is impossible for me to say which has priority, I agree with Lea that it is better to adopt Barnes's well-known name.

Conch., 1st ser., III, 1845, p. 12.—* KUSTER, Conch. Cab. Unio, 1852, p. 19, pl. III, fig. 1.

* *Symphynota fragilis* FERUSSAC, Guer. Mag., 1835, p. 25.
* *Metaptera fragilis* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 260.
* *Unio fragilis* var. *gracilis* PÆTEL, Conch. Sam., III, 1890, p. 153.
* *Mya plana* EATON, Zool. Text-Book, 1826, p. 221.
* *Unio planus* CONRAD, New F. W. Shells, 1834, p. 71.
* *Unio* (*Niäa*) *atrata* SWAINSON, Zool. Ill., 1841, pl. CLXXI.
* *Unio atratus* HANLEY, Test. Moll., 1842, p. 199; * Biv. Shells, 1843, p. 199, pl. XXI, fig. 29.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—* PÆTEL, Conch. Sam., III, 1890, p. 145.

Entire Mississippi River drainage, St. Lawrence system; Red River of the North; Hudson River; eastern Texas.

†LAMPSILIS LÆVISSIMUS Lea.

* *Symphynota lævissima*, LEA, Tr. Am. Phil. Soc., III, 1830, p. 444, pl. XIII, fig. 23; * Obs., I, 1834, p. 58, pl. XIII, fig. 23.—SHORT and EATON, Transylvania Jl., 1831, p. 80.
* *Unio lævissima*, DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 558; 3d ed., II, 1839, p. 675.
* *Unio lævissimus* CONRAD, New F. W. Shells, 1834, p. 70.—* HANLEY, Test. Moll., 1842, p. 174; * Biv. Shells, 1843, p. 174, pl. XXI, fig. 41.—* CATLOW and REEVE, Conch. Nom., 1845, p. 60.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 498.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XLVI, fig. 250.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 156.
* *Margarita* (*Unio*) *lævissimus* LEA, Syn., 1836, p. 11; 1838, p. 13.
* *Margaron* (*Unio*) *lævissimus* LEA, Syn., 1852, p. 19; 1870, p. 28.
* *Unio ohioensis* SAY, Am. Conch., VI, 1834.—KUSTER, Conch. Cab., 1866, p. 20, pl. LXIX, fig. 5.
* *Symphynota ohioensis* FERUSSAC, Guer. Mag., 1835, p. 25.
* *Metaptera ohioiensis* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 260.
* *Unio discoideus* SOWERBY, Conch. Icon., XVI, 1866, pl. LIII, fig. 275.

Mississippi drainage generally; eastern Texas; southern Michigan; western New York.

†LAMPSILIS ALABAMENSIS Conrad.

* *Symphynota inflata* LEA, Tr. Am. Phil. Soc., IV, 1831, p. 99, pl. XIV, fig. 28; Obs., I, 1834, p. 109, pl. XIV, fig. 28.—FERUSSAC, Guer. Mag., 1835, p. 25.
* *Metaptera inflata* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 260.
* *Margarita* (*Unio*) *inflatus* LEA, Syn., 1836, p. 11, 1838, p. 13.
* *Unio inflatus* HANLEY, Test. Moll., 1842, p. 174; * Biv. Shells, 1843, p. 174, pl. XXI, fig. 45.—* CATLOW and REEVE, Conch. Nom., 1845, p. 60.—* KUSTER, Conch. Cab. Unio, 1852, p. 17, pl. II, fig. 1.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 498.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XLV, fig. 246.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 155.
* *Margaron* (*Unio*) *inflatus* LEA, Syn., 1862, p. 28; 1870, p. 28.
* *Unio alabamensis* CONRAD, New F. W. Shells, 1834, p. 67.[1]

Alabama and Tombigbee River areas.

[1] New name given by Conrad for *Unio inflatus* Lea, preoccupied by Barnes.

(Group of *Lampsilis amphichænus.*)

Shell rather thin, elongate, elliptical, rounded before, pointed behind, compressed, with a smooth, shining, black, rayless epidermis; beaks not prominent, their sculpture unknown; there is a conspicuous gap at the anterior base, and another very distinctly outlined at the upper part of the posterior end like that of *Schizothærus;* hinge line slightly curved; pseudocardinals imperfect; laterals compressed; nacre purplish; female shell inflated at posterior base.

Animal with large, elliptical palpi; mantle slightly thickened at the edge; anal opening widely separated from the superanal, the latter large; foot large, hatchet-shaped. Several animals were examined, but all were so much decayed that most of the characters could not be made out.

†LAMPSILIS AMPHICHÆNUS Frierson.

**Unio* (*Lampsilis*) *amphichænus* FRIERSON, Nautilus, XI, 1898, p. 10, pl. I.

(Group of *Lampsilis leptodon.*)

Shell rather thin, elongate, elliptical, compressed, decidedly pointed behind, the point raised above the center of the shell; beaks low, their sculpture very feeble; there is a conspicuous post-dorsal wing in young shells, and sometimes vestiges of an anterior wing; young shell rather dull and faintly rayed; there is a decided anterior basal and posterior gap; hinge teeth very imperfect; pseudocardinals often almost wanting, even in young shells; laterals faint, sometimes wanting in the adult shell; nacre coppery to purplish; female shell not inflated at post base.

Animal with large, very thin, light brown branchiæ, free nearly the whole length of the abdominal sac; palpi large, thin, nearly semicircular; mantle thin, with a wide crenulate border; marsupium projecting slightly below the inner gills.

†LAMPSILIS LEPTODON Rafinesque.[1]

**Unio* (*Leptodea*) *leptodon* RAFINESQUE, Ann. Gen. Sci. Phys. Brux., 1820, p. 295, pl. LXXX, figs. 5–7.

**Unio leptodon* SAY, Am. Conch., VI, 1834.—* CONRAD, New F. W. Shells, 1834, p. 70; Monog., VII, 1836, p. 58, pl. XXXIII.—* CHENU, Bib. Conch., 1st ser., III, 1845, p. 12, pl. I, figs. 5–7.—* KUSTER, Conch. Cab. Unio, 1861, p. 197, pl. LXIV, figs. 1, 2.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XLVIII, fig. 257.—* PÆTEL, Conch. Sam., III, 1890, p. 157.

* *Symphynota leptodon* FERUSSAC, Guer. Mag., 1835, p. 25.

* *Leptodea leptodon* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 262.

* *Anodon purpurascens* SWAINSON, Zool. Ill., 1st ser., III, pl. CLX, 1823.—* CATLOW and REEVE, Conch. Nom., 1845, p. 67.

* *Unio velum* SAY, New Harm. Disseminator, II, September 23, 1829, p. 293; January 15, 1831 (newspaper form).—* FERUSSAC, Guer. Mag., 1835, p. 28.—* L. W. SAY, Terr. & Fluv. Shells, 1840, p. 5.

[1] This is one of the few species which its author has described so distinctly that I feel sure there can be no doubt about it. Besides, his figure, such as it is, is something like the *tenuissimus* of Lea.

* *Symphynota tenuissima* LEA, Tr. Am. Phil. Soc., III, 1829, p. 453, pl. XI, fig. 21; *Obs. 1, 1834, p. 67, pl. XI, fig. 21.

Symphynota tenuissima SHORT and EATON, Transylvania Jl., 1831, p. 80.

* *Margarita* (*Unio*) *tenuissimus* LEA, Syn., 1836, p. 38; 1838, p. 25.

* *Unio tenuissimus* HANLEY, Test. Moll., 1842, p. 206; *Biv. Shells, 1843, p. 206, pl. XX, fig. 42.—*CATLOW and REEVE, Conch. Nom., 1845, p. 64.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—*SOWERBY, Conch. Icon., XVI, 1866, pl. XLIV, fig. 240.—*B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *tenuissimus* LEA, Syn., 1852, p. 38; 1870, p. 61.

Upper Mississippi River drainage, south to the Tennessee River; Buffalo, New York; southern Michigan; Souris River, Manitoba.

(Group of *Lampsilis scutulatus*.)

Shell rhombic elliptical, compressed, rather thin, with a high posterior and a low anterior wing, with two posterior ridges; the valves often exhibiting fine radiating plications on the posterior part; beaks compressed, sometimes showing the nepionic shell, almost destitute of sculpture, which, when present, consists of faint indications of two rounded loops; epidermis rather dull, sometimes indistinctly rayed; left valve with two pseudocardinals, the anterior a sharp, straight ridge sloping obliquely downward and forward from a point just in front of the beaks, the hinder curiously compressed and showing a tendency to break into denticles; right valve with two sharp, ridge-like, sloping pseudocardinals; laterals slender, compressed, straight or wavy; nacre bluish white to pale violet; dorsal scars few; female shell apparently slightly swollen at the posterior base; animal unknown.

LAMPSILIS SCUTULATUS Morelet.

* *Unio scutulatus* MORELET, Test. Noviss., I, 1849, p. 30.—*FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 561, pl. LIX, fig. 5; LXVII, fig. 6.

Yucatan.

LAMPSILIS PALUDOSUS Morelet.

* *Unio paludosus* MORELET, Test. Noviss., I, 1849, p. 30.—*FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1849, p. 559, pl. LIX, fig. 3.

Yucatan.

LAMPSILIS PLANIVALVIS Morelet.

* *Unio planivalvis* MORELET, Test. Noviss., II, 1851, p. 24.—*FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 560, pl. LIX, fig. 2.[1]

Usumasinta River, Guatemala.

† LAMPSILIS DELPHINULUS Morelet.

* *Unio delphinulus* MORELET, Test. Noviss., I, 1849, p. 31.—*HANLEY, Biv. Shells, 1856, p. 381, pl. XXIII, fig. 60.—*SOWERBY, Conch. Icon., XVI, 1866, pl. XLIII, fig. 237.—*B. H. WRIGHT, Check List, 1888.—*PJETEL, Conch. Sam., III, 1890, p. 150.—*FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 557, pl. LXIII, figs. 2, 2*a*, 2*b*.

* *Margaron* (*Unio*) *delphinulus* LEA, Syn. 1870, p. 28.

Guatemala.

[1] These three may be mere variations of one thing.

LAMPSILIS LARGILLIERTI Philippi.

* *Unio largillierti* PHILIPPI, Zeits. für Mal., IV, 1847, p. 94.[1]

Yucatan.

The following are unfigured and unknown to me:

* *Lampsilis fasciola* RAFINESQUE, Ann. Gen. Sci. Brux., V, 1820, p. 299.
* *Lampsilis fulgens* RAFINESQUE, Cont. Monog., 1831, p. 7.
* *Lampsilis argyratus* RAFINESQUE, Cont. Monog., 1831, p. 7.

Genus PSEUDOSPATHA Simpson, 1900.

(Type, *Spatha tanganyicensis* Smith.)[2]

Burtonia BOURGINGUAT, Moll. Fluv. Nyanza, 1883, p. 20.[3]

Shell compressed, thin, oblique, inequilateral, with a straight dorsal line which ends in a small wing in front and behind, rounded and cut away at the anterior base, produced in the post-basal region, gaping in front and behind, slightly twisted on its axis and usually bent posteriorly to the right or left; a low, often double posterior ridge ends in a biangulate point behind; beaks compressed, the sculpture faint, irregular, concentric ridges which continue over the shell, and at the beaks sometimes become rather sharply pustulous, the glochidium often remaining; epidermis yellowish brown, sometimes delicately rayed; teeth rudimentary, one or more faint compressed pseudocardinals and a single lateral in each valve; muscle scars irregular; nacre coppery or purple, often rayed. Animal unknown.

*PSEUDOSPATHA TANGANYICENSIS Smith.

* *Spatha tanganyicensis* SMITH, Proc. Zool. Soc. Lond., 1880, p. 350, pl. XXXI, fig. 8.
* *Burtonia tanganyicinsis* PÆTEL, Conch. Sam., III, 1890, p. 187.—VON MARTENS, Beschalte, 1897, p. 257.
* *Burtonia moineti* BOURGUIGNAT, Un. and Ir. Tan., 1886, p. 33; Icon. Mal. Tan., 1888, pl. XXV, fig. 1.
* *Burtonia lavigerina* BOURGUIGNAT, Un. and Ir. Tan., 1886, p. 36; Icon., Mal. Tan., 1888, pl. XXIV, figs. 1–4.
* *Burtonia magnifica* BOURGUIGNAT, Un. and Ir. Tan., 1886, p. 41; Icon. Mal. Tan., 18-8, pl. XXVI, figs. 1–2.

Lakes Tanganyika and Nyanza, Africa.

PSEUDOSPATHA LEOPOLDVILLENSIS Putzeys.

Burtonia leopoldvillensis PUTZEYS, Proc. Verb. Soc. Mal. Belg., 1898, pl. XXVIII., fig. 16.

Leopoldville, Congo.

[1] Unfigured and unknown to me. From the description I should think likely it belonged here, but it may not.

[2] The shells of this group bear a striking likeness to that of *Unio tennissimus* Lea, in form, texture, color, teeth, and in gaping in front and behind, and I am inclined to believe that they are related to it, and the *Unio myersianus* of Southeastern Asia, to *Unio alatus*, and *U. delphinulus* of Central America.

[3] Name preoccupied in birds, 1850.

† PSEUDOSPATHA LIVINGSTONENSIS Bourguignat.

* *Spatha tanganyicensis* SMITH (part), Proc. Zool. Soc. Lond., 1880, pl. XXXI, fig. 8*a*; 1881, p. 296, pl. XXXIV, fig. 32.

* *Burtonia livingstonensis* BOURGUIGNAT, Moll. Fluv. Nyanz., 1883, p. 20.

* *Burtonia elongata* BOURGUIGNAT, Un. and Ir. Tan., 1886, p. 34; Icon. Mal. Tan., 1888, pl. XXV, fig. 3.

* *Burtonia contorta* BOURGUIGNAT, Un. and Ir. Tan., 1886, p. 39; Icon. Mal. Tan., 1888, pl. XXVI, figs. 3–5.

Lake Tanganyika.

PSEUDOSPATHA SUBTRIANGULARIS Bourguignat.

* *Burtonia subtriangularis* BOURGUIGNAT, Un. and Ir. Tan., 1886, p. 35; Icon. Mal. Tan., 1888, pl. XXV, fig. 2.

* *Burtonia grandidieriana* BOURGUIGNAT, Un. and Ir. Tan., 1886, p. 42; Icon. Mal. Tan., 1888, pl. XXVII, figs. 1–3.

Lake Tanganyika.

PSEUDOSPATHA BOURGUIGNATI Bourguignat.[1]

* *Burtonia bourguignati* BOURGUIGNAT, Un. and Ir. Tan., 1886, p. 38; Icon. Mal. Tan., 1888, pl. XXVII, figs. 4–5.

Lake Tanganyika.

The following species are unfigured and unknown to me.

* *Burtonia jouberti* BOURGUIGNAT, Un. and Ir. Tan., 1886, p. 40.

* *Burtonia bridouxi*, BOURGUIGNAT, Un. and Ir. Tan., 1886, p. 40.

All from Lake Tanganyika.

Genus HYRIOPSIS Conrad, 1853.

(Type, *Unio delphinus* Gruner.[2])

Hyriopsis CONRAD, Pr. Ac. N. Sci. Phila., 1853, p. 269.

Shell large, compressed, rhomboid-elliptical, dorsally winged and generally biangulate behind, sometimes produced in the post-basal region; beaks low, mostly compressed, the sculpture consisting of numerous concentric ridges nearly parallel with the growth lines, generally extending well on to the disk of the shell, the earlier ones fine, often slightly nodulous or doubly looped; epidermis olive to brown, sometimes faintly rayed; pseudocardinals two or three in the left valve, one to three in the right, when young compressed, but often breaking into irregular denticles when old; laterals long, compressed, two in the left valve and one in the right, sometimes vertically striate, the left valve often having a sort of raised lamellar tooth at or just behind the beak.

[1] Said to be of Joubert in the literature.

[2] The general make-up of the shells of this genus, *Cyclomya*, and *Cristaria* seems to indicate close relationship to each other, and a not distant one to the subgenus *Proptera* of *Lampsilis*, and I should not be surprised to learn that the marsupium occupies the posterior part of the outer gills in distinctly marked ovisacs.

Beak cavities shallow; dorsal scars numerous, extending from the cavity downward and forward. Anterior muscle scars three, distinct, posterior large, indistinct; front end of the shell usually thickened; a row of plications often occurring just below the laterals, as in *Cristaria*.

Animal unknown.

(Group of *Hyriopsis bialatus*.)

Shell somewhat trapezoidal, with a posterior ridge, biangulate behind, with a very high, pointed, triangular, posterior wing, and a smaller, pointed one in front, which projects forward; beaks low, sculpture not seen; epidermis brown; pseudocardinals broken up into denticles; hinge line slightly curved; the three anterior muscle scars separate and deep; dorsal scars not extending greatly downward in front; nacre bluish white.

†HYRIOPSIS BIALATUS Simpson.[1]

* *Unio delphinus* GRUNER Arch. für Naturg, I, 1841, p. 276, pl. IX, figs. 1, 1*a*–*c*.—* DELESSERT, Rec. Coq. Lam., 1841, pl. XIX, fig. 3, 3*a*, 3*b*.—* LEA, Tr. Am. Phil. Soc., VIII, 1843, p. 218, pl. XVII, fig. 35; * Obs., III, 1842, p. 56, pl. XVII, fig. 35.[2]—* KUSTER, Conch. Cab. Unio, 1852, p. 18, pl. II, figs. 2–4.—* HANLEY, Biv. Shells, 1856, p. 381, pl. XX, fig. 44.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 498.—* CHENU, Man., 1859, II, p. 143, fig. 707.—SOWERBY, Conch. Icon., XVI, 1866, pl. XLIII, fig. 238.—* MORELET, Series Conch., IV, 1875, p. 345.—* PÆTEL, Conch. Sam., III, 1890, p. 150.

* *Margaron* (*Unio*) *delphinus* LEA, Syn. 1852, p. 19; 1870, p. 28.

* *Unio megapterus* MORELET, J. de Conch., XII, 1863, p. 159.—* PÆTEL, Conch. Sam., III, 1890, p. 158.

Southeastern Asia, including Cambodia, Siam, and the Malay Peninsula.

(Group of *Hyriopsis cumingii*.)

Shell rather thin, with a high wing posteriorly, and a smaller one in front; beaks greatly compressed, their sculpture at first consisting of fine and later of coarse concentric ridges, extending well on to the disk; corrugations on the posterior slope distinct.

HYRIOPSIS CUMINGII Lea.

* *Unio cumingii* LEA, Pr. Ac., N. Sci. Phila., VII, 1852, p. 54.—* LEA, Jl. Ac. N. Sci. Phila., IV, 1860, p. 240, pl. XXXV, fig. 120; * Obs., VII, 1860, p. 58, pl. XXXV, fig. 120.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 498.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XLIX, fig. 264.—* HEUDE, Conch. Fluv. Nank., VIII, pl. LXIV.

* *Margaron* (*Unio*) *cumingii* LEA, Syn., 1852, p. 19; 1870, p. 28.

China.

[1] I regret that Gruner's well-known name *delphinus* was previously used for a *Unio* by Spengler, and the term *megapterus* of Morelet was applied by Rafinesque to a *Metaptera* (*Unio*) and used by Chenu under the generic name *Unio* before 1863. It will therefore have to have a new name.

[2] Lea described this species under the above name, not knowing that it had been already applied to the same species by Gruner.

†HYRIOPSIS DELAPORTEI Crosse and Fischer.

**Unio* (*Arconaia*) *delaportei* CROSSE and FISCHER, J. de Conch., XXVI, 1876, p. 327, pl. X, fig. 1; XI, fig. 5.[1]

Cambodia; Siam.

(Group of *Hyriopsis myersianus.*)

Shell rather solid, thickened in front; posterior ridge rather low; beaks compressed, the sculpture consisting, apparently, of a few rather faint, irregular ridges, sometimes slightly nodulous.

†HYRIOPSIS MYERSIANUS Lea.

**Unio myersianus* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 92; *Jl. Ac. N. Sci. Phila., III, 1857, p. 290, pl. XXII, fig. 2; *Obs., VI, 1857, p. 10, pl. XXII, fig. 2.—*SOWERBY, Conch. Icon., XVI, 1866, pl. L, fig. 265.—*MORELET, Ser. Conch., IV, 1875, p. 344.—*PÆTEL, Conch. Sam., III, 1890, p. 160.

**Margaron* (*Unio*) *myersianus* LEA, Syn., 1870, p. 28.

* † *Unio housei* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 92; *Jl. Ac. N. Sci. Phila., III, 1858, p. 291, pl. XXIII, fig. 3; *Obs., VI, 1857, p. 11, pl. XXIII, fig. 3.—*VON MARTENS, Pr. Zool. Soc. Lond., 1860, p. 14.—*SOWERBY, Conch. Icon., XVI, 1866, pl. XLVIII, fig. 260.—*PÆTEL, Conch. Sam., III, 1890, p. 155.

**Margaron* (*Unio*) *housei* LEA, Syn., 1870, p. 28.

Siam; Cambodia.

HYRIOPSIS SUTRANGENSIS L. Morlet.

**Unio sutrangensis* L. MORLET, Jl. de Conch., XXXVII, 1889, p. 195, pl. IX, fig. 3.

Sutrang River, Siam.

HYRIOPSIS PINCHONIANUS Heude.

**Unio pinchonianus* HEUDE, Conch. Fluv. Nank, VIII, 1883, pl. LXIII, fig. 12.—PÆTEL, Conch. Sam., III, 1890, p. 163.

China.

(Group of *Hyriopsis vagulus.*)

Shell elliptical, with a rather high, posterior wing, moderately solid, with two slight posterior ridges and a sulcus above them at the juncture of the wing.

HYRIOPSIS VAGULUS Fischer.[2]

**Unio subtrigonus* SOWERBY, Conch. Icon., XVI, 1867, pl. LVIII, fig. 292.—*PÆTEL, Conch. Sam., III, 1890, p. 169

**Margaron* (*Unio*) *subtrigonus* LEA, Syn., 1870, p. 28.

[1] The ventral line of this shell is crooked, having a couple of curves in it, but it is not twisted. Its authors believed *Arconaia* to be only a section of *Unio*, and that the animal was essentially like that of that genus.

[2] Sowerby published this species as *Unio subtrigonus* in the Conchologia, the name being preoccupied by Deshayes. In the errata he changed it to *Unio* (*Monocondylæa*) *cambojensis*, believing it to be the same as Petit's *Pseudodon cambojensis*. It certainly is not that shell, and I agree with Fischer that it is near to the *Unio myersianus*, and accept his name for it.

* *Unio* (*Monocondylæa*) *cambojensis* SOWERBY, Conch. Icon., XVI, errata.
* *Pseudodon cambojensis* MORELET, Ser. Conch., IV, 1875, p. 336.
* *Unio lamellatus* HANLEY and THEOBALD, Conch. Ind., 1876, p. 5, pl. IX, fig. 6.
* *Unio vagulus* FISCHER, Bull. Soc. Autun., IV, 1891, p. 223.

Siam.

(Group of *Hyriopsis velthuzeni*.)

Shell somewhat inflated, rather thin, rounded behind, winged; epidermis dark brown with numerous green rays; nacre iridescent, bluish white; anterior scars irregular, rather small; posterior scars rounded; pseudocardinals elongated, one in each valve, in the right valve there is a secondary rudimental one; laterals elongate, arcuate, one in the right valve and two in the left.

†HYRIOPSIS VELTHUZENI Schepman.

* *Unio velthuzeni* SCHEPMAN, Notes from Leyden Mus., XVII, 1895, p. 160, pl. IV, figs. 1, 1a—† DROUET, Jl. de Conch., XLV, 1897, p. 124.

Mandai River, Borneo.

(Group of *Hyriopsis schlegeli*.)

Shell rather thin, slightly winged behind, narrowly rounded before and angled at umbonial slope; posterior ridge high and rounded, beaks rather low; epidermis rough, blackish; hinge line curved in front, straight behind; pseudocardinals generally entire; plications below the laterals faint; nacre dull, lurid purplish or lead color.

†HYRIOPSIS SCHLEGELI von Martens.

* *Unio schlegeli* VON MARTENS, Mal. Blatt., VII, 1861, p. 55.—* KOBELT, Abh. Senck, Nat. Ges., XI, 1879, p. 421, pl. XIV.—* VON MARTENS, Nov. Conch., V, 1879, p. 192, pl. CLVIII, figs. 4, 5.—* VON IHERING, Abh. Senck, Nat. Ges., XVIII, 1893, p. 156.
* *Barbala schlegeli* PÆTEL, Conch. Sam., III, 1890, p. 175.

Japan.

Subgenus CAUDICULATUS Simpson, 1900.

(Type, *Unio caudiculatus* von Martens.)

Shell oval, inflated, slightly posteriorly winged, with a well-developed posterior ridge, and above it a deep, wide furrow ending in a broad, well-defined notch on the posterior slope; one pseudocardinal in the right valve and two in the left; two laterals in the left valve and one in the right. Animal unknown.[2]

HYRIOPSIS CAUDICULATUS Von Martens.

* *Unio caudiculatus* VON MARTENS, Mal. Bl., XIV, 1866, p. 16.—* SCHEPMAN, Notes Leyd. Mus., XVIII, 1896, p. 140.—* DROUET, J. de Conch., XLV, 1897, p. 126.
* *Unio infrarostratus* SCHEPMAN, Notes Leyd. Mus., XVII, 1895, p. 161, pl. IV, fig. 2.

Borneo.

[1] According to the photographic figure this shell very closely resembles *Unio alatus* Say.

[2] I am in doubt as to the relationship of this species.

Genus CHAMBERLAINIA Simpson, 1900.

(Type, *Unio hainesianus* Lea.)

Shell large, very solid in front, thinner behind, round or round obovate, without posterior ridge, alate on the post dorsal part when young; beaks full, sculpture not seen; surface without sculpture excepting a few slightly pustulous corrugations on the posterior slope; epidermis dull, not rayed; hinge curved; pseudocardinals rather small, stumpy, two in the left valve and one in the right; laterals short, remote, the intervening hinge plate rounded, one lateral in the right valve and two in the left, the upper the smaller, and all curved upward along their inner edges; beak cavities not deep; dorsal muscle scars numerous, deep, extending from the cavity downward and forward; area outside the palleal line very wide; nacre lurid bronzy. Animal unknown.

†CHAMBERLAINIA HAINESIANA Lea[1].

[a] *Unio hainesianus* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 92; [b] Jl. Ac. N. Sci. Phil., III, 1857, p. 289, pl. XXI, fig. 1; [c] Obs. VI, 1857, p. 9, pl. XXI, fig. 1.—[d] VON MARTENS, Pr. Zool. Soc. Lond., 1860, Pt. 1, p. 15.—[e] SOWERBY, Conch. Icon., XVI, 1866, pl. XLVII, fig. 254.[2]—[f] MORELET, Ser. Conch., IV, 1875, p. 312.—[g] P.ETEL, Conch. Sam., III, 1890, p. 154.

[h] *Margaron* (*Unio*) *hainesianus* LEA, Syn., 1870, p. 28.

[i] *Unio imperialis* MORELET, Rev. et Mag. Zool., XIV, 1862, p. 480.

Siam.

CHAMBERLAINIA PAVIEI Morelet.

[a] *Unio paviei* MORELET, J. de Conch., XXXIX, 1891, p. 241, pl. VII, fig. 3.[3]

Siam.

†CHAMBERLAINIA DUCLERCI Rochebrune.[4]

[a] *Unio duclerci* ROCHEBRUNE, Bull. Soc. Phil., VII, 1882, p. 27, pl. I, fig. 2 (in extract).

Mekong River, Siam.

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[1] The type consists of a single valve of a young individual. *U. imperialis* according to its author attains a size of 142 mm. in height, 192 mm. in length, and 77 mm. in diameter. I have seen a very fine specimen in the Frederick Stearns collection 6 inches high and 8 in length. It is one of the most magnificent Naiades in the world.

[2] Credited by Sowerby to the Little Arkansas River.

[3] Very close to *C. housei*, but more rounded, and having a higher wing. I do not think this can be the same as Morelet's *Unio pairanus*, described in Latin in the Journal in 1865, p. 227, and unidentifiable.

[4] It is quite probable that this should form the type of a separate group, but the only specimens I have seen, two badly eroded valves, hardly justify me in separating it.

Genus CRISTARIA Schumacher, 1817.

(Type, *Dipsas plicatus* Leach.)

Barbala HUMPHREYS, Mus. Col., 1797.
Dipsas LEACH, Zool. Miscellany I, 1814, p. 119.
Cristaria SCHUMACHER, Essai Nouv. Syst., 1817, p. 107.
Appius (LEACH), Menke. Syn., 2d ed., 1828, ? p. 106.
Symphynota LEA (part), Tr. Am. Phil. Soc., 1830, p. 445.—SWAINSON, Mal., 1840, p. 288.
Dianisotis RAFINESQUE, Cont. Monog., 1831, p. 7.
Dipsax VOIGT, Cuvier, Thierreich, III, 1834, p. 493.
Barbata, SOWERBY, Conch. Man., 1842, p. 81.
Clione GISTEL, Nat. Sur. Hoh. Schule Bearb., 1848.

Shell generally thin, elliptical, more or less winged posteriorly; beaks rather low, sculptured with fine, somewhat doubly-looped ridges at first, and later with coarse, low, concentric bars, which are nearly parallel with the growth lines; epidermis smooth, often somewhat rayed; hinge teeth imperfect; pseudocardinals feeble or wanting—when present consisting of a single compressed tooth in each valve; laterals single, remote, compressed, sometimes wanting in adult shells.[1]

Subgenus CRISTARIA, Schumacher, 1817.

(Type, *Dipsas plicatus* Leach.)

Shell large, thicker in front, strongly alate posteriorly, with two or more slightly developed radial ridges on the posterior slope and a row of plications above them; hinge line regularly curved; dorsal scars forming a row running obliquely downward and forward; anterior scars often blurred, posterior faint.

†CRISTARIA PLICATA Leach.

* *Dipsas plicatus* LEACH, Zool. Miscellany, I, 1815, p. 120, pl. LIII.[2]—* SOWERBY, Conch. Man., 1839, fig. 142.—* CHENU, Bib. Conch, 1st ser., III, 1845, p. 15, pl. VI, fig. 1.—* MORELET, Ser. Conch., IV, 1875, p. 332.—* HEUDE, Conch. Fluv. Nank., 1879, pls. XXXIII, XXXIV, LI, fig. 94.
Mytilus plicatus SOLANDER, in Gray, Ann. of Phil., IX, 1825, p. 27.
Appius plicatus GRAY, in Menke, Syn. Meth. Moll., 1830, p. 106.
* *Margarita* (*Dipsas*) *plicatus* LEA, Syn., 1836, p. 47; 1838, p. 28.
* *Margaron* (*Dipsas*) *plicatus* LEA, Syn., 1852, p. 46; 1870, p. 74.
* *Unio plicatus* SOWERBY, Conch. Icon., XVII, 1868, pl. LIV., fig. 280.
* *Dipsas plicata* TROSCHEL, Arch. für Naturg., XIII, 1874, p. 272.—* KOBELT, Abh. Senck. Nat. Ges., XI, 1879, p. 429, pls. XV–XVII, XVIII, fig. 1.
* *Barbala plicata* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 501, pl. CXVII, figs. 4, 4*a*.
* *Anodonta plicata* SCHRENCK, Reis. und F. Am. Lande, II, 1867, p. 704, pl. XXVII, fig. 4.

[1] The animal has been described in Japanese, but the paper containing the description is inaccessible to me.

[2] This seems to be the first authentic description of this species. It has been claimed that the *Mytilus dubius* of Gmelin is this, but he refers to figures 733, pl. 82, in the eighth volume of Chemnitz, which, I am quite certain, is not the species in question.

* *Anodonta (Dipsas) plicata* CLESSIN, Conch. Cab. Anodonta, 1876, p. 240, pl. XXI, figs. 1, 2.
* *Cristaria plicata* VON IHERING, Abh. Senck. Nat. Ges., XVIII, 1893, p. 147.
* *Cristaria tuberculata* SCHUMACHER, Ess. Nouv. Syst., 1817, p. 140, pl. XX, fig. 2.
* *Anodonta dipsas* BLAINVILLE, Man. Mal., 1825, p. 538, pl. LXVI, fig. 2.
* *Symphynota bialata* LEA, Tr. Am. Phil. Soc., 1830, p. 445, pl. XIV, fig. 24; * Obs., I, 1831, p. 59, pl. XIV, fig. 24.
* *Unio bialata* HANLEY, Test. Moll. 1842, p. 219; * Biv. Shells, 1843, p. 214, pl. XXII, fig. 4.
* *Barbala bialata* CHENU, Man. 1859, p. 145, fig. 717.—* PÆTEL, Conch. Sam., III, 1890, p. 175.
* *Unio bialatus* DESHAYES, Tr. Elem. Conch., 1839, p. 19, pl. XXXI, fig. 3.—* CATLOW and REEVE, Conch. Nom., 1845, p. 56.—* DESHAYES, Tr. Elem., II, 1853, p. 218, pl. XXXI, fig. 3.—* SOWERBY, Conch. Icon., XVI, 1868, pl. XLVI, fig. 247.
* *Anodonta magnifica* CLESSIN, Conch. Cab. Anodonta, 1873, p. 123, pl. XXXV, fig. 1.
* *Dipsas occidentalis* HEUDE, Conch. Fluv. Nank., IX, 1885, pl. XLVI.
* *Barbala occidentalis* PÆTEL, Conch. Sam., III, 1890, p. 175.
* *Barbala plicatula* PÆTEL, Conch. Sam., III, 1890, p. 175.

China; Japan; Amurland, south probably to Cambodia. The form from Cambodia, which is referred to *C. plicata*, is believed by Fischer to be different, and it may be *C. bellua*.

† CRISTARIA BELLUA Morelet.

**Anodonta bellua* MORELET, Rev. et Mag. Zool., XVIII, 1866, p. 167; Ser. Conch., IV, 1875, p. 331.

Cambodia.

† CRISTARIA HERCULEA Middendorff.

Anodonta herculea MIDDENDORFF, Bull. Phys. Math. Ac. St. Pet., VI, 1848, p. 303; Sib. Reise, II, 1851, p. 278, pl. XXI, fig. 5; XXII, figs. 1, 2; XXVI, figs. 1, 2.[1]—* DESHAYES, Bull. Nouv. Arch. Mus., IX, 1873, p. 1, pl. I, fig. 1.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 294.
* *Anodonta (Dipsas) herculea* CLESSIN, Conch. Cab. Ano., 1875, p. 175, pl. LIX, figs. 1, 2.
* *Cristaria herculea* VON IHERING, Abh. Senck. Nat. Ges., XVIII, 1893, p. 146.
* *Barbala herculea* PÆTEL, Conch. Sam., III, 1890, p. 175.
* *Dipsas plicata* var. *clessini* KOBELT, part. Abh. Senck. Nat. Ges., XI, 1879, p. 429, pl. XV.[2]

East Siberia; Amurland; North China.?

† CRISTARIA SPATIOSA Clessin.

* *Anodon herculeus* SOWERBY, Conch. Icon., XVII, 1867, pl. III, fig. 7.
* *Anodonta (Dipsas) spatiosa* CLESSIN, Conch. Cab. Anodonta, 1875, p. 173, pl. LVII, fig. 2.

[1] Plate XXVI, fig. 2, an interior view, is probably *Anodonta beringiana* Middendorff.
[2] *Craspedodonta smaragdina* ANTON, Verz. der Conch., 1839, p. 16, No. 592; Clessin, Conch. Cab. Ano., 1875, p. 93, pl. XXVII, fig. 2, a badly figured little shell, said to come from North America, may be a young *C. herculea*.

**Cristaria spatiosa* VON IHERING, Abh. Senck. Nat. Ges., XVIII, 1893, p. 145.
**Barbala spatiosa* PÆTEL, Conch. Sam., III, 1890, p. 175.
**Dipsas plicata* var. *japonica* KOBETT, Abh. Senck. Nat. Ges., XI, 1879, p. 429, pl. XLVII.

Japan.

Subgenus PLETHOLOPHUS Simpson, 1900.

(Type, *Symphynota discoidea* Lea.)

Shell short-elliptical, lenticular, scarcely thickened in front, with compressed beaks which are sculptured with low, wide, concentric ridges, scarcely winged in front or behind, pointed posteriorly; epidermis smooth, somewhat rayed; hinge teeth very feeble, often nearly wanting; dorsal scars few; muscle scars faint. Animal unknown.

† CRISTARIA DISCOIDEA Lea.

**Symphynota discoidea* LEA, Tr. Am. Phil. Soc., V, 1834, p. 75, pl. XI, fig. 33; * Obs., I, 1834, p. 187. pl. XI, fig. 33.
**Barbala discoidea* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 501.—* CHENU, Man., 1859, II, p. 145, fig. 716.—* PÆTEL, Conch. Sam., 1890, p. 175.
**Dipsas discoidea* KUSTER, Conch. Cab. Unio, 1862, p. 306, pl. C, fig. 1.
**Margarita* (*Unio*) *discoideus* LEA, Syn., 1836, p. 47; 1838, p. 28.
**Unio discoideus* HANLEY, Test. Moll., 1842, p. 214; * Biv. Shells, 1843, p. 214, pl. XXI, fig. 57.—* CATLOW and REEVE, Conch. Nom., 1845, p. 58.
**Margaron* (*Unio*) *discoideus* LEA, Syn., 1852, p. 46; 1870, p. 74.
**Unio tenuis* GRAY, Griffith's Cuv., XII, 1834, p. 601 (index), pl. XXIV, fig. 2.[1]
**Anodonta chinensis* KUSTER, Conch. Cab. Ano., 1853, p. 51, pl. XII, fig. 3.
**Unio magnificus* SOWERBY, Conch. Icon., XVI, 1867, pl. LVII, fig. 289.
**Anodonta gruneriana* CLESSIN, Conch. Cab. Ano., 1875, p. 172, pl. LVI, figs. 3, 4.

China.

CRISTARIA PARVULA Heude.[2]

**Dipsas parvulus* HEUDE (part), Conch. Fluv. Nank., IV, 1878, pl. XXXII, fig. 65.
**Barbala parvula* PÆTEL, Conch. Sam., III, 1890, p. 175.

China.

CRISTARIA REINIANA von Martens.

**Cristaria reiniana* VON MARTENS, Jahrb. Mal. Ges., II, 1875, p. 136, pl. III, fig. 4.
* † *Dipsas reiniana* KOBELT, Abh. Senck. Nat. Ges., XI, 1879, p. 432, pl. XII, fig. 4; XXI, fig. 2.
**Anodonta reiniana* VON IHERING, Abh. Senck. Nat. Ges., XVIII, 1893, p. 147.[3]
**Barbata reiniana* PÆTEL, Conch. Sam., III, 1890, p. 175.

Japan.

[1] A brief description is given in the index only. Gray's and Lea's names seem to have been published the same year, and I do not know which appeared first. I use Lea's because it is the one generally known.

[2] I am doubtful whether this is more than a variety of *C. discoidea*. Heude's figure on plate LIII is a very different thing, which I have called *C. radiata*.

[3] Martens says it has distinct cardinals and laterals.

CRISTARIA GENTILIANA Heude.

* *Cristaria gentilianus* HEUDE, Conch. Fluv. Nank., VII, 1881, pl. LIII, fig. 98.
* *Barbala gentiliana* PÆTEL, Conch. Sam., III, 1890, p. 175.

China.

† CRISTARIA SWINHOEI H. Adams.

* *Unio swinhoei* H. ADAMS, Proc. Zool. Soc. Lond., 1866, p. 319.[1]—SOWERBY, Conch. Icon, XVI, 1868, pl. XLII, fig. 232.—PÆTEL, Conch. Sam., III, 1890, p. 169.
* *Anodonta swinhoei* H. ADAMS, Proc. Zool. Soc. Lond., 1866, p. 446.—* CLESSIN, Conch. Cab. Anodonta, 1876, p. 125, pl. LXXV, fig. 6.—* PÆTEL, Conch. Sam., III, 1890, p. 185.
* *Anodon swinhoei* SOWERBY, Conch. Icon., XVI, 1868, pl. XXVII, fig. 108.
* *Margaron* (*Unio*) *swinhoei* LEA, Syn., 1870, p. 45.

Formosa; Tonkin; Cambodia.

Subgenus CRASSITESTA Simpson, 1900.

(Type, *Cristaria radiata* Simpson.)

Shell rather solid, elliptic-rhomboid, with a rounded posterior ridge, scarcely winged; beaks full, sculpture not seen; epidermis bright, strongly rayed, with two conspicuous light and three dark rays on the posterior slope; hinge line curved; pseudocardinals and laterals reduced to the merest vestiges; dorsal scars only one or two in the cavity of the beaks; adductor scars faint; nacre lurid.

† CRISTARIA RADIATA Simpson.[2]

* *Dipsas parvulus* HEUDE (part), Conch. Fluv. Nank., VII, 1881, pl. LII, fig. 96.

China.

Genus LEPIDODESMA Simpson, 1896.

(Type, *Unio languilati* Heude.)

Lepidodesma SIMPSON, Proc. U. S. Nat. Mus., 1896, p. 311.

Shell large, thin, inflated, with a high, sharp, posterior ridge and a second fainter one above, making the hinder part widely biangulate; beaks very high and full, their sculpture, which extends over the whole shell, consisting of ridges that follow the growth lines; there are two rows of radiating nodules, one on the middle of the disk, and a stronger one on the post ridge; ligament very large, wide, covered with concentric scales; hinge line arched; two pseudocardinals in the left valve, the anterior elongated, running inwardly across the hinge plate, and ending abruptly, with a shorter, fainter one behind it; with two strong laterals, the inner the higher, its edge reflexed upward, and suddenly truncate behind; one low elongated pseudocardinal in the right valve,

[1] This seems to be a *Cristaria* of the *discoidea* section. The cardinals are somewhat better developed than is common among Cristarias, but are still quite faint.

[2] Heude has figured two different species under the name of *Dipsas parvulus*, on plate XXXII. I have therefore given the last-described form the name *radiata*.

and one lateral, which is reflexed upward; epidermis folded into the hinge, and scaly; a single dorsal scar on the inner side of each hinge plate; muscle scars united; palleal line distinct; beak cavities large and wide; nacre very dull. Animal unknown.

† LEPIDODISMA LANGUILATI Heude.

* *Unio languilati* HEUDE, J. de Conch., XXII, 1874, p. 116; * Conch. Fluv. Nank., I, 1875, pl. VII.—PÆTEL, Conch. Sam., III, 1890, p. 156.
* *Lepidodesma languilati* SIMPSON, Pr. U. S. Nat. Mus., XVIII, 1896, p. 311.
* *Cristaria megadesma* VON MARTENS, S. B. Nat. Fr., 1875, p. 3; * Mal. Bl., XXII, 1875, p. 187; * Nov. Conch., IV, 1876, p. 152, pl. CXXXV, fig. 1.
* *Barbula megadesma* PÆTEL, Conch. Sam., III, 1890, p. 175.

China.

LEPIDODESMA ALIGERA Heude.

* *Unio languilatus* var. *aligerus* HEUDE, Conch. Fluv. Nank., III, 1877, pl. XVII, fig. 37.—* PÆTEL, Conch. Sam., III, 1890, p. 156.
* *Lepidodesma aligera* SIMPSON, Pr. U. S. Nat. Mus., XVIII, 1896, p. 311.

China.

Genus PILSBRYOCONCHA Simpson, 1900.

(Type, *Anodonta exilis* Lea.)

Shell elongated, elliptical, compressed, thin, with a low, posterior wing, narrow and rounded in front, nearly straight below, expanded at the post-basal region, pointed behind. Beaks compressed, sculptured with several coarse, low, irregularly concentric undulations, often slightly doubly looped; surface nearly smooth, shining, yellowish to ashy brownish, sometimes showing very faint rays; hinge straight or slightly curved, reduced to a mere line, often showing a faint, compressed, smooth tooth in front of the beaks, otherwise edentulous; nacre brilliant, silvery and iridescent; muscle scars faint. Animal pure milky white; lobes of the mantle united behind into two short siphons.[1]

† PILSBRYOCONCHA LINGUÆFORMIS Morelet.

* *Anodonta linguæformis* MORELET, Ser. Conch., IV, 1875, p. 329, pl. XIV, fig. 5.—* PÆTEL, Conch. Sam., III, 1890, p. 181.
* *Margaron* (*Unio*) *linguæformis* LEA, Syn., 1870, p. 48.

Siam; Cambodia.

† PILSBRYOCONCHA EXILIS Lea.

* *Anodonta exilis* LEA, Tr. Am. Phil. Soc., VI, 1839, p. 81, pl. XXII, fig. 68; * Obs., II, 1838, p. 81, pl. XXII, fig. 68.—* TROSCHEL, Arch. für Naturg., V, 1839, Pt. 2, p. 239.—* HANLEY, Test. Moll., 1842, p. 224; * Biv. Shells, 1843, p. 224.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* MORELET, Ser. Conch., IV, 1875, p. 327.—* CLESSIN, Conch. Cab. Ano., 1875, p. 171, pl. LVI, figs. 6-8.—* PÆTEL, Conch. Sam., III, 1890, p. 179.

[1] According to Deshayes, Jl. de Conch., 1875, pp. 81-85. He does not give any other characters of the soft parts.

* *Margarita* (*Anodonta*) *exilis* LEA, Syn., 1838, p. 32.
* *Anodon exilis* CATLOW and REEVE, Conch. Nom., 1845, p. 66.
* *Margaron* (*Anodonta*) *exilis* LEA, Syn., 1852, p. 51; 1870, p. 82.
* *Monocondylæa exilis* PÆTEL, Conch. Sam., III, 1890, p. 174.
* *Anodonta siliqua* KUSTER? Conch. Cab. Ano., 1852, p. 57, pl. XIV, fig. 5.
* *Anodonta polita* MOUSSON, L. and Suss. Moll. Java, 1849, p. 98, pl. XIX, figs. 2, 3.—* MOUSSON, Zeits. für Mal., VII, 1851, p. 46.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 504.—* PÆTEL, Conch. Sam., III, 1890, p. 183.
* *Margaron* (*Anodonta*) *polita* LEA, Syn., 1852, p. 53.
* *Anodon politus* SOWERBY, Conch. Icon., XVII, 1867, pl. XII, fig. 36.
* † *Monocondylæa compressa* LEA, Pr. Ac. N. Sci. Phila., VII, 1863, p. 190; * Jl. Ac. N. Sci. Phila., VI, 1866, p. 30, pl. XI, fig. 29; * Obs., XI, 1867, p. 34, pl. XI, fig. 29.—* CLESSIN, Conch. Cab. Ano., 1876, p. 258, pl. LXXX, figs. 3, 4.
* *Pseudodon compressa* CONRAD, Am. Jl. Conch., I, 1865, p. 233.
* *Margaron* (*Monocondylæa*) *compressa* LEA, Syn., 1870, p. 73.
* *Spatha compressa* PÆTEL, Conch. Sam., III, 1890, p. 188.
* *Anodon javana* SOWERBY, Conch. Icon., XVII, 1867, pl. XI, fig. 33.
* *Anodon gracilis* SOWERBY? Conch. Icon., XVII, 1867, pl. XIV, fig. 45.
* *Anodon kelletti* SOWERBY? Conch. Icon., XVII, 1867, pl. XIX, fig. 71.
* † *Anodonta sempervirens* DESHAYES, Nouv. Arch. de Mus., X, 1874, p. 120, pl. V, figs. 4, 5.—* PÆTEL, Conch. Sam., III, 1890, p. 184.

Southeastern Asia, Sumatra, Java.

† PILSBRYOCONCHA CARINIFERA Conrad.

* *Anodonta carinifera* CONRAD, Cover of Monography, No. 9, 1837.[1]—TROSCHEL, Arch. für Naturg., IV, 1838, Pt. 2, p. 288.—B. H. WRIGHT, Check List, 1888.

Southeastern Asia, probably.

PILSBRYOCONCHA LEMSLEYI Morelet.

* *Anodonta lemsleyi* MORELET,[2] Ser. Conch., IV, 1875, p. 328, pl. XIV, fig. 1.—PÆTEL, Conch. Sam., III, 1890, p. 181.

Cambodia, Siam.

PILSBRYOCONCHA SCHOMBURGKI von Martens.

* *Anodonta schomburgki* VON MARTENS, Proc. Zool. Soc. Lond., 1860, p. 15.—* PÆTEL, Conch. Sam., III, 1890, p. 184.

Siam.

Genus MEDIONIDUS Simpson, 1900.

(Type, *Unio conradicus* Lea.)

Medionidus SIMPSON, Pr. Ac. N. Sci. Phila., 1900, p. 77.

Shell elongated, rather inflated, often arcuate when adult, sometimes having a posterior ridge; dorsal slope and occasionally the posterior

[1] There is a specimen of *Pilsbryoconcha* in the Philadelphia Academy which agrees perfectly with Conrad's description, and is probably the type. My attention was called to this by Mr. Pilsbry, who believes this to be the shell Conrad described. It is rather a small species.

[2] An old, elongated, rather peculiar shell. Conrad's species may be the young of it, and Morelet believes that Martens' *A. schomburgki* is very close to his shell I have not seen a sufficient amount of material of this genus to determine with certainty whether all these are valid species.

portion of the shell plicately or nodulously wrinkled; epidermis smooth and bright, variegated with broken green rays and blotches; beak sculpture consisting of rather fine, subparallel, often broken ridges in two loops, the anterior rounded, the posterior somewhat angled, occasionally broken up into zigzags;[1] pseudocardinals small, stumpy and somewhat roughened; laterals rather short, slightly curved and club-shaped, remote; dorsal cicatrices few, placed under the hinge just behind the beaks; anterior cicatrices rather deep; posterior cicatrices rounded, large, and well impressed; anterior part of shell somewhat thickened; female shell slightly swollen just behind the middle of the base.

Animal with the inner gills wholly or in part free from the abdominal sac; marsupium occupying the central posterior part of the outer gills, sometimes extending nearly their whole length, consisting of few to many rather large, irregular ovisacs, which are not so distinctly marked out as in *Lampsilis*, but which have rounded bases; mantle much thickened on its lower edge, which is dark colored and sometimes papillous.

(Group of *Medionidus conradicus*.)

Shell small, usually with a well-defined posterior ridge; posterior end and sometimes the greater part of the shell slightly wrinkled or nodulous; epidermis rather smooth, painted with rays broken into irregular arrow-head markings or blotches; pseudocardinals rather small and imperfectly developed; laterals of left valve separated by a narrow, shallow furrow; nacre greenish, purplish, or bluish. The male shell is often decidedly arcuate; that of the female is swollen at or behind the center of the base. Animal having the characters of the genus.

†MEDIONIDUS CONRADICUS Lea.

* *Unio conradicus* LEA, Tr. Am. Phil. Soc., VI, 1834, p. 63, pl. IX, fig. 23; * Obs., I, 1834, p. 175, pl. IX, fig. 23.—* FERUSSAC, Guerin. Mag., 1835, p. 29.—* HANLEY, Test. Moll., 1842, p. 176; * Biv. Shells, 1843, p. 176, pl. XXIII, fig. 22.—* CATLOW and REEVE, Conch. Nom., 1845, p. 57.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 247.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—*KUSTER, Conch. Cab. Unio, 1861, p. 179, pl. LVI, fig. 5.—* SOWERBY, Conch. Icon., XVI, 1866, pl. LIV, fig. 278.—* PÆTEL, Conch. Sam., III, 1890, p. 148.

* *Margarita* (*Unio*) *conradicus* LEA, Syn., 1836, p. 13; 1838, p. 14.

* *Margaron* (*Unio*) *conradicus* LEA, Syn., 1852, p. 21.

* *Unio conradius* CONRAD, Monog., X, 1838, p. 87, pl. XLVII, fig. 3.

* *Margaron* (*Unio*) *conradianus* LEA, Syn., 1870, p. 32.

* *Unio conradianus* B. H. WRIGHT, Check List, 1888.

Tennessee River drainage; Cahawba River, Alabama, and probably the entire Alabama River system.

[1] The beaks in all the specimens of *Unio subtentus* that I have examined were too badly eroded to make out the character of the sculpture with certainty. In a general way they seemed to be much like those of the *Conradicus* group, only coarser.

†MEDIONIDUS PARVULUS Lea.

**Unio parvulus* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 307; *Jl. Ac. N. Sci. Phila., VI, 1866, p. 45, pl. XVI, fig. 43; *Obs., XL, 1867, p. 49, pl. XVI, fig. 43.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *parvulus* LEA, Syn., 1870, p. 32.

Coosa River, Alabama; Chattanooga and Swamp creeks, northwest Georgia.

†MEDIONIDUS PENICILLATUS Lea.

**Unio penicillatus* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 171; *Jl. Ac. N. Sci. Phila., IV, 1859, p. 203, pl. XXIII, fig. 85; *Obs., VII, 1859, p. 21, pl. XXIII, fig. 85.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *penicillatus* LEA, Syn., 1870, p. 32.

Chattahoochee and Flint rivers, Georgia.

†MEDIONIDUS KINGI B. H. Wright.

Unio kingi B. H. WRIGHT, Nautilus, XII, 1900, p. 138.

Branch of Flint River, Baker County, Georgia.

†MEDIONIDUS ACUTISSIMUS Lea.

**Unio acutissimus* LEA, Tr. Am. Phil. Soc., IV, 1831, p. 89, pl. X, fig. 18; *Obs., I, 1834, p. 99, pl. X, fig. 18.—*CONRAD, New F.W. Shells, 1834, p. 67.—*FERUSSAC, Guer. Mag., 1835, p. 28.—*CONRAD, Monog., X, 1838, p. 86, pl. XLVII, fig. 2.—*HANLEY, Test. Moll., 1842, p. 177; *Biv. Shells, 1843, p. 177, pl. XXII, fig. 35.—*CATLOW and REEVE, Conch. Nom., 1845, p. 55.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 244.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—*CHENU, Ill. Conch., 1858, pl. VIII, figs. 3, 3*a*, 3*b*.—*SOWERBY, Conch. Icon., XVI, 1866, pl. XXXVI, fig. 189.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 143.

**Margarita* (*Unio*) *acutissimus* LEA, Syn., 1836, p. 14; 1838, p. 14.

**Margaron* (*Unio*) *acutissimus* LEA, Syn., 1852, p. 21; 1870, p. 32.

**Unio semiplicatus* KUSTER, Conch. Cab. Unio, 1862, p. 279, pl. XCIV, fig. 4.[1]—*PÆTEL, Conch. Sam., III, 1890, p. 167.

**Unio rubellinus* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 32; *Jl. Ac. N. Sci. Phila., IV, 1858, p. 70, pl. XIII, fig. 51; *Obs., VI, 1858, p. 70, pl. XIII, fig. 51.—*SOWERBY, Conch. Icon., XVI, 1868, pl. XC, fig. 490.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 166.

**Margaron* (*Unio*) *rubellinus* LEA, Syn., 1870, p. 32.

Alabama River system.

(Group of *Medionidus walkeri*.)

Shell rather short, inflated, with a high, posterior ridge; posterior slope strongly corrugated; epidermis dark, slightly clouded; nacre reddish or greenish.

[1]There is a *Unio semiplicatus* of Troschel in Wiegman's Archiv. for 1841, p. 180, but I do not know what is. Kuster credits his species to Australia, but it is evidently Lea's shell, no such species being found in Australia.

† MEDIONIDUS WALKERI B. H. Wright.

* *Unio walkeri* B. H. WRIGHT, Naut., XI, 1897, p. 91.
* *Lampsilis walkeri* SIMPSON, Pr. Ac. N. Sci. Phila., 1900, p. 77, pl. I. fig. 5.

Suwanee River, Florida; Ocklockonee River, Georgia.

(Group of *Medionidus subtentus.*)

Shell elongate-elliptical, scarcely inflated, with an ill-defined posterior ridge, the posterior slope being strongly, corrugately wrinkled; beaks apparently sculptured with coarse, irregular, broken ridges, somewhat doubly looped; epidermis bright, with broken rays which sometimes form irregular patches, but are usually developed into square spots; pseudocardinals rather small, stumpy; laterals rather strong, club-shaped, generally showing traces of vertical striation; nacre dull, bluish-white. The female shell is very slightly inflated just behind the center of the base, the male often becomes arcuate when old.

Animal unknown.

† MEDIONIDUS SUBTENTUS Say.

* *Unio subtentus* SAY, Jl. Ac. N. Sci. Phila., V, 1825, p. 130; Am. Conch., I, No. 2, 1831, pl. XV.—* CONRAD, Am. Jl. Sci., XXVI, 1834, p. 343, pl. I, fig. 1; * New F.W. Shells, 1834, p. 71.—* FERUSSAC, Guer. Mag., 1835, p. 26.—* MÖLLER, Syn. Nov. Gen., 1836, p. 209.—* CONRAD, Monog., X, 1838, p. 85, pl. XLVIII, fig. 1.—* HANLEY, Test. Moll., 1842, p. 176; * Biv. Shells, 1843, p. 176, pl. XX, fig. 34.—* CHENU, Bib. Conch., 1st ser., III, 1845, p. 25, pl. IV, figs. 2, 2*a*, 2*b*.—* CATLOW and REEVE, Conch. Nom., 1845, p. 64.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 258.—* KUSTER, Conch Cab. Unio, 1856, p. 164, pl. XLVII, fig. 4.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXII, fig. 370.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 168.
* *Margarita* (*Unio*) *subtentus* LEA, Syn., 1836, p. 13; 1838, p. 14.
* *Margaron* (*Unio*) *subtentus* LEA, Syn., 1852, p. 21; 1870, p. 32.
* *Unio subtenta* DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 555; 3d ed., II, 1839, p. 675.

Tennessee and Cumberland River systems.

Genus NEPHRONAIAS Crosse and Fischer, 1893.

(Type, *Unio plicatulus* Charpentier.)

Nepronaias CROSSE and FISCHER, Miss. Sci., Pt. 7, II, 1893, p. 556.

Shell elliptical, biangulate behind, that of the male showing a tendency to become arcuate with age, the female usually having a postbasal inflation and never arcuate; surface concentrically sculptured; beaks low, with faint broken ridges which show a tendency to fall into two rounded loops; pseudocardinals generally rather compressed, ragged, laterals obliquely ridged; cavity of the beaks rather deep, dorsal muscle scars distinct, running in a line from the beak cavity downward and forward. Animal with the branchiæ rounded below, outer the larger behind, inner the larger anteriorly, free from the abdominal sac

for all or part of their length; mantle thickened on the edge, which is often dark colored; anal and branchial openings large and well furnished with papillæ. Nothing is known of the marsupium of any members of this group, the animals examined probably being males; but it is most likely that when gravid the ovules will be found in distinctly marked ovisacs in the posterior part of the outer gills, something as in *Lampsilis*.

(Group of *Nephronaias medellinus*.)

Shell scarcely sulcate, shining, rather brightly rayed, distinctly biangulate behind, solid, swollen; beaks rather full, with delicate sculpture; pseudocardinals solid, stumpy, trigonal; laterals heavy, somewhat club-shaped; nacre rich and soft, silvery or purple; female shell considerably inflated at the post-basal region, and differing somewhat from that of the male.

†NEPHRONAIAS MEDELLINUS Lea.

?*Unio purpuriatus* SAY, New Harmony, Diss. (newspaper form), January 15, 1831.[1]

* *Unio medellinus* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 39, pl. XII, fig. 34; * Obs., II, 1838, p. 39, pl. XII, fig. 34.—* TROSCHEL, Arch. für Naturg., V, 1839, Pt. 2, p. 236.—* HANLEY, Test. Moll, 1842, p. 193; * Biv. Shells, 1843, p. 193, pl. XXI, fig. 19; pl. XXIII, fig. 8.—* CATLOW and REEVE, Conch. Nom., 1845, p. 61.—* CHENU, Ill. Conch., 1858, pl. XVII, figs. 6, 6*a*, 6*b*.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* KUSTER, Conch. Cab., 1861, p. 162, pl. XLVI, fig. 5.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXIII, fig. 171.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 158.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 603.

* *Margarita* (*Unio*) *medellinus*, LEA, Syn., 1836, p. 26; 1838, p. 19.

* *Margaron* (*Unio*) *medellinus*, LEA, Syn., 1852, p. 29; 1870, p. 45.

† * *Unio strebeli*, LEA,[2] Pr. Ac. N. Sci. Phila., X, 1866, p. 133; * Jl. Ac. N. Sci. Phila., VI, 1868, p. 318, pl. LI, fig. 131; * Obs., XII, 1869, p. 78, pl. LI, fig. 131.—* B. H. WRIGHT, Check List, 1888.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 595.

* *Margaron* (*Unio*) *Strebeli*, LEA, Syn., 1870, p. 53.

State of Vera Cruz, Mexico.

†NEPHRONAIAS SAPOTALENSIS Lea.

* *Unio sapotalenses* LEA, Pr. Am. Phil. Soc., II, 1841, p. 30; * Tr. Am. Phil. Soc., VIII, 1842, p. 233, pl. XXI, fig. 47; * Obs., III, 1842, p. 71, pl. XXI, fig. 47.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 257.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* CHENU, Ill. Conch., 1858, pl. XXXIII, figs. 4, 4*a*, 4*b*.—* SOWERBY, Conch. Icon., XVI, 1868, pl. XLI, fig. 495.—* B. H. WRIGHT, Check List.

[1] Believed by Conrad to be the same as Lea's *medellinus*. Fischer and Crosse in Mission Scientifique (see following reference) are doubtful about this, as Say's species was never figured, and his description does not just agree with Lea's species. As the type is not known to be in existence I think under the circumstances, since we can not be sure of what Say described, it is best to use Lea's name.

[2] The type which is in the collection of the U. S. National Museum is, without doubt, a young *medellinus*.

1888.—* PÆTEL, Conch. Sam., III, 1890, p. 166.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 601, pl. LXVII, figs. 2, 2*a*.

* *Margaron* (*Unio*) *sapotalensis* LEA, Syn., 1852, p. 29; 1870, p. 45.

Sapotal River, Vera Cruz, Mexico.

(Group of *Nephronaias averyi*.)[1]

Shell triangular-ovate, bluntly pointed in front, and biangulate behind, considerably inflated, irregularly sulcate; umbonal region moderately developed; beaks sculptured with fine, irregular ridges which have a tendency to fall into two rounded loops; pseudocardinals slightly compressed, ragged; laterals having feeble, oblique striation; front part of the shell somewhat thickened; posterior part thinner; nacre dull, whitish.

Animal unknown.

† NEPHRONAIAS AVERYI Lea.

* *Unio averyi* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 281; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 269, pl. XLIV, fig. 149; * Obs., VII, 1860, p. 87, pl. XLIV, fig. 149.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *averyi* LEA, Syn., 1870, p. 36.

Isthmus of Darien.

† NEPHRONAIAS CALDWELLII Lea.

* *Unio caldwellii* LEA, Pr. Ac. N. Sci. Phila., II, 1858, p. 118; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 265, pl. XLIII, fig. 145; * Obs., VII, 1860, p. 83, pl. XLIII, fig. 145.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXIX, fig. 477.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 147.

* *Margaron* (*Unio*) *caldwellii* LEA, Syn., 1870, p. 35.

Isthmus of Darien.

(Group of *Nephronaias macnielii*.)

Shell solid, slightly sulcate, biangulate behind, covered with a dull, olivaceous epidermis and having faint, bluish green rays; beaks rather full, sculpture feeble, consisting of slightly outlined ridges, somewhat doubly looped, the looped lines becoming swollen or nodulous at their bases; pseudocardinals compressed and ragged; laterals obliquely striated; nacre bluish white, very soft and brilliant, somewhat iridescent posteriorly; male and female shells differing but slightly. Animal unknown.

† NEPHRONAIAS MACNIELII Lea.

* *Unio macnielii* LEA, Pr. Ac. N. Sci. Phila., XIII, 1869, p. 124; * Jl. Ac. Nat. Sci. Phila., 1874, p. 25, pl. VIII, fig. 22; * Obs., XIII, 1874, p. 29, pl. VIII, fig. 22.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 158.

Nicaragua.

[1] I have only seen two specimens of Lea's *Unio averyi* and one of his *U. caldwellii*, and I can not be certain as to their systematic position. In the latter the beak sculpture, which is slightly worn, is much of the character of the species of *Nephronaias* generally, and not like that of *Unio*, and though somewhat worn the shell shows traces on the posterior end of faint, bluish green rays. One of the former is slightly more inflated in the post-basal region than the other.

†NAPHRONAIAS OREGONENSIS Lea.[1]

* *Unio oregonensis* LEA, Pr. Am. Phil. Soc., V, 1852, p. 252; *Tr. Am. Phil. Soc., X, 1852, p. 275, pl. XXII, fig. 33; *Obs., V, 1852, p. 31, pl. XXII, fig. 33.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—*MUSGRAVE, Phot. Conch., 1863, pl. II, fig. 5.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXXIV, fig. 383.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 162.

* *Margaron* (*Unio*) *oregonensis*, LEA, Syn., 1852, p. 29; 1870, p. 45.

Nicaragua.

†NEPHRONAIAS ROWELLII Lea.

* *Unio rowellii* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 153; *Jl. Ac. N. Sci. Phila., IV, 1860, p. 256, pl. XL, fig. 136; *Obs., VII, p. 74, pl. XL, fig. 136.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXVIII, fig. 471.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 166.

* *Margaron* (*Unio*) *rowellii* LEA, Syn., 1870, p. 35.

Nicaragua; Guatemala; Chagres River, Colombia.

†NEPHRONAIAS GOASCORANENSIS Lea.

* *Unio goascoranensis* LEA, Pr. Ac. N. Sci. Phila., II, 1858, p. 118; *Jl. Ac. N. Sci. Phila., IV, 1860, p. 258, pl. XLI, fig. 139; *Obs., VII, 1860, p. 76, pl. XLI, fig. 139.—*B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *goascoranensis* LEA, Syn., 1870, p. 45.

Goascoran River, Honduras.

†NEPHRONAIAS DYSONII Lea.

* *Unio dysonii* LEA, Pr. Ac. N. Sci. Phila., XI, 1859, p. 152; *Jl. Ac. N. Sci. Phila., IV, 1860, p. 252, pl. XXXIX, fig. 132; *Obs., VII, 1860, p. 70, pl. XXXIX, fig. 132.—*B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *dysonii* LEA, Syn., 1870, p. 35.

Honduras; Costa Rica.

†NEPHRONAIAS TEHUANTEPECENSIS Crosse and Fischer.

* *Unio tehuantepecensis* CROSSE and FISCHER, J. de Conch., XLI, 1893, p. 296.—*FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 618, pl. LXV, figs. 3, 3*a*, 4.

Isthmus of Tehuantepec, Oaxaca, Mexico; Honduras.

(Group of *Nephronaias reticulatus*.)

Shell evenly elliptical, slightly biangulate behind, solid and inflated; surface covered with fine, concentric ridges and having delicate, radiating furrows which cut the sulcations and form them into loops.

[1] I formerly believed that this species, with the one preceding and following it, ran together. More recent study, with a large amount of additional material, inclines me to think that perhaps they may be valid species. Under the name of *Unio rowellii* Mr. Lea has in his collection two large *N. macneilii*, one large *rowellii*, three smaller ones and several valves, and two *goascoranensis*, a species which is very close to the rest, but probably as good as most of the Mexican forms. I find specimens which I can scarcely refer with certainty to *macneilii* or *oregonensis*, but which seem to have to some extent the characters of both. This, with a number of the Mexican and Central American forms, is exceedingly puzzling. This species occurs with *N. rowellii* and *macneilii*.

†NEPHRONAIAS RETICULATUS Simpson.

* *Nephronaias reticulatus* SIMPSON, Pr. Ac. N. Sci. Phila., 1900, p. 77, pl. II, fig. 3.

Patook River, Honduras.

(Group of *Nephronaias scamnatus*.)

Shell elliptical to elongate, compressed, strongly sulcate, rather solid, subbiangular behind; that of the female inflated at post-base; epidermis olive to brown, sometimes feebly rayed; beak sculpture delicate and but slightly marked, consisting of faint, parallel ridges, which show a tendency to fall into two rounded loops; hinge rather solid; pseudocardinals stumpy, ragged, laterals straight; front part of the shell solid and suddenly becoming thinner behind; nacre bluish, white, salmon, or purple.

Animal unknown.

†NEPHRONAIAS SCAMNATUS Morelet.

* *Unio scamnatus* MORELET, Test. Nov., No. 1, 1849, p. 30.—* POEY, Mem. Hist. Cuba, II, 1858, p. 417.—* ARANGO, Faun. Mal, Cuba, 1878, p. 144.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 167.

* *Margaron* (*Unio*) *scamnatus* LEA, Syn., 1852, p. 40; 1870, p. 35.

* *Unio gundlachi* SOWERBY, Conch. Icon., XVI, 1866, pl. XLVI, fig. 248.

Cuba; Honduras?

†NEPHRONAIAS GUNDLACHI Dunker.

* *Unio gundlachi* DUNKER,[1] Mal. Blatt., V, 1858, p. 228.—* ARANGO, Faun. Mal. Cuba, 1878, p. 144.—* P.ETEL, Conch. Sam., III, 1890, p. 154.

Cuba.

NEPHRONAIAS ÆRUGINOSUS Morelet.[2]

* *Unio æruginosus* MORELET, Test. Noviss., I, 1849, p. 29.—* B. H. WRIGHT, Check List, 1888.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 596, pl. LXII, figs. 2, 2*a*, 2*b*.

River Michol, at Palenque, State of Chiapas, Mexico.

[1] Lea and Poey regard this as the equivalent of *N. scamnatus* of Morelet, while Arango believes it to be distinct. Unfortunately both species were described in Latin and not figured, but Dunker states that his species is inflated posteriorly and has a bluish nacre, and it is probable that he had before him a female shell when he wrote the description, for one of the Cuban species, which I think is *gundlachi*, has a bluish nacre, and the female shell is decidedly swollen at the post-basal region. In another form, which I presume is *N. scamnatus* of Morelet, the nacre is rather dark, the shell somewhat elongated, and that of the female does not greatly differ from the male.

[2] I am not positive that this species belongs here, but its form is like that of most of the members of the genus, and Crosse and Fischer state that the beaks in their specimen are entire and smooth. In several of the species of this genus the beak sculpture is very faint, while in *Unio* it is almost always strong. These considerations lead me to place the species here.

NEPHRONAIAS YZABALENSIS Crosse and Fischer.

* *Unio yzabalensis* CROSSE and FISCHER, J. de Conch., XL, 1892, p. 294.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 597, pl. LXIV, figs. 4, 4*a*, 4*b*.[1]

Lake Ysabal, Guatemala.

† NEPHRONAIAS RUGULOSUS Charpentier in Küster.

* *Unio rugulosus* CHARPENTIER in KUSTER, Conch. Cab. Unio, 1856, p. 154, pl. XLIV, fig. 5.—* PÆTEL, Conch. Sam., III, 1890, p. 166.[2]

Habitat.—A shell in the Lea collection, which I take to be this, is marked "Mexico."

NEPHRONAIAS PERSULCATUS Lea.[3]

* *Unio persulcatus* LEA, Pr. Ac. N. Sci. Phila., XI, 1859, p. 153; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 255, pl. XL, fig. 135; * Obs., VII, 1860, p. 73, pl. XL, fig. 135.—* MUSGRAVE, Phot. Conch., 1863, pl. II, fig. 3.—* B. H. WRIGHT, Check List, 1888.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 614.

* *Margaron* (*Unio*) *persulcatus* LEA, Syn., 1870, p. 36.

Mexico.

† NEPHRONAIAS CALIMATARUM Morelet.

* *Unio calimatarum* MORELET, Test. Noviss., I, 1849, p. 30.—* ? SOWERBY, Conch. Icon., XVI, 1868, pl. LXXIV, fig. 385.[4]—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 147.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 612.

Margaron (*Unio*) *calimatarum* LEA, Syn., 1870, p. 63.

Mexico; Guatemala.

† NEPHRONAIAS TABASCOENSIS Charpentier in Kuster.

* *Unio tabascoensis* CHARPENTIER in KUSTER, Conch. Cab. Unio, 1856, p. 153, pl. XLIV, fig. 3[5].—* B. H. WRIGHT, Check List, 1888.—* CROSSE and FISCHER, Miss. Sci., Pt. 7, II, 1894, p. 611.

* *Margaron* (*Unio*) *tabascoensis* LEA, Syn., 1870, p. 61.

Mexico; Honduras; Cuba?

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[1] Probably a mere variety of *æruginosus*.

[2] Kuster credits this species to Australia and says that it has a purple nacre. The nacre of all the Australian species is whitish, and the shell is evidently a member of this group.

[3] This and the related species are extremely puzzling. Although I have been able to examine a good deal of material, yet I find great variation in the specimens, and few of them acurately agree with the figures and descriptions.

[4] Fischer and Crosse believe this to be Morelet's species. It looks like a short *cuprinus*, but Sowerby says it is solid, and has a dirty-white nacre, while *cuprinus* is rather thin and is copper colored throughout.

[5] The specimens which I have seen do not wholly agree with Kuster's figure and description, but are nearer to that than anything else. The material in the U. S. National Museum is mostly from Honduras though there are specimens credited to Cuba. Lea referred these to *N. scamnatus* Morelet.

†NEPHRONAIAS PLICATULUS Charpentier in Kuster.

**Unio plicatulus* CHARPENTIER in KUSTER, Conch. Cab. Unio, 1856, p. 154, pl. XLIV, fig. 4.—*FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 598.

Mexico.

†NEPHRONAIAS RAVISTELLUS Morelet.

**Unio ravistellus* MORELET, Test. Noviss., No. 1, 1849, p. 29.—*KUSTER, Conch. Cab. Unio, 1856, pl. XLII, fig. 6.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 165.—*FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 609, pl. LXI, figs. 4, 5, and 5*a*.

**Margaron* (*Unio*) *ravistellus* LEA, Syn., 1870, p. 40.

Guatemala.

†NEPHRONAIAS VELLICATUS Reeve.

**Unio vellicatus* REEVE, Conch. Icon., XVI, 1865, pl. XXII, fig. 103.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 171.—*FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 610.

Guatemala.

NEPHRONAIAS MELLEUS Lea.

**Unio melleus* LEA, Pr. Ac. N. Sci. Phila., XI, 1859, p. 152; *Jl. Ac. N. Sci. Phila., IV, 1860, p. 250, pl. XXXVIII, fig. 129; *Obs. VII, 1860, p. 68, pl. XXXVIII, fig. 129.—*REEVE, Conch. Icon., XVI, 1865, pl. XXI, fig. 92.—*PÆTEL, Conch. Sam., III, 1890, p. 158.

**Margaron* (*Unio*) *melleus* LEA, Syn., 1870, p. 35.[1]

Mexico or Central America, no doubt.

GENUS GLEBULA Conrad 1853.

(Type, *Unio rotundata* Lamarck.)[2]

Glebula CONRAD, Pr. Ac. N. Sci. Phila., 1853, p. 268.

Shell solid, much inflated, short elliptical, bluntly pointed and slightly biangulate behind, with a low, posterior ridge; female shell swollen at post base; beaks compressed, the sculpture not seen; epidermis brownish, clothlike; pseudocardinals divided into irregularly radiating, granular lamina, sometimes to the number of a dozen or more in each valve; hinge plate reduced to a mere rounded line behind the pseudocardinals; laterals short, remote, anterior adductor scars deep, smooth; there is in each valve only a single, large, semicircular posterior scar

[1] I am not certain just where this and the preceding species should be placed. This remark can be applied to a number of other forms placed in this genus.

[2] I have examined a number of animals of the only species of this curious genus, but regret that they were badly decayed, and that none were gravid. In one specimen several ovisacs were distended with gas, and these were separated by a deep sulcus. This fact, the union of the inner gills with the abdominal sac, and the postbasal swelling seen on some shells incline me to believe that it is a highly organized species.

with a straight edge in front; dorsal scars numerous, distinct, placed back of the pseudocardinals; cavity of the beaks not deep or compressed; nacre dull lurid to purplish brown.

Animal with gills nearly equal in size, inner slightly the larger in front, united the whole length to the abdominal sac; ovisacs apparently separated from each other by a sulcus as in *Lampsilis;* palpi very large, wide, wrinkled; mantle having a wide, slightly thickened border, double edged, the inner being beautifully toothed; branchial opening papillose; anal crenulate; foot small; whole animal the color of the nacre.

† GLEBULA ROTUNDATA Lamarck.

* *Unio rotundata* LAMARCK, An. sans Vert., VI, 1819, p. 75.—*LEA, Obs., I, 1834, p. 201.

* *Glebula rotundata* CONRAD, Pr. Ac. N. Sci. Phila., 1853, p. 268.

* *Unio rotundatus* HANLEY, Test. Moll., 1842, p. 201; *Biv. Shells, 1843, p. 201, pl. XXIII, fig. 30.—*CATLOW and REEVE, Conch. Nom., 1845, p. 63.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 257.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—*KUSTER, Conch. Cab. Unio, 1861, p. 256, pl. LXXXVI, fig. 4.—*REEVE, Conch. Icon., XVI, 1865, pl. XXIII, fig. 106.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 166.—*CALL, Tr. Ac. Sci. St. Louis, VII, 1895, p. 47, pl. IX.

* *Margarita* (*Unio*) *rotundatus* LEA, Syn., 1836, p. 33; 1838, p. 23.

* *Margaron* (*Unio*) *rotundatus* LEA, Syn. 347, 1852, p. 34; 1870, p. 55.

* *Unio suborbiculata* LAMARCK, An. sans Vert., VI, 1819, p. 81.—*LEA, Obs., I, 1834, p. 201.—*DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 546; 3d ed., II, 1839, p. 671.

* *Unio suborbiculatus* FERUSSAC, Guer. Mag., 1835, p. 26.

Unio glebulus SAY, Transylvania Jl., IV, 1831, p. 526.—SAY, Am. Conch., No. IV, 1832, pl. XXXIV; No. V, 1832, p. 4 (of cover).—CONRAD, New F. W. Shells, 1834, p. 69.—CHENU, Bib. Conch., 1st ser., III, 1845, p. 46, pl. XI, figs. 10–12.—SOWERBY, Conch. Icon., XVI, pl. LXXIV, fig. 384.

* *Unio glebulus* PÆTEL, Conch. Sam., III, 1890, p. 154.

* *Unio subglobosus* LEA, Tr. Am. Phil. Soc., V, 1834, p. 30, pl. II, fig. 3; *Obs., I, 1834, p. 142, pl. II. fig. 3.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXIV, fig. 321.

* *Unio granadensis* CONRAD,[1] Pr. Ac. N. Sci. Phila., VII, 1855, p. 256.—*B. H. WRIGHT, Check List, 1888.

Louisiana; eastern Texas; Rio Grande River; Escambia County, Florida.

[1] Conrad says it is suboval, with the disks somewhat flattened, with minute, radiating lines extending to the tips of the beaks. The *rotundata* sometimes shows radiating ridges at the beaks in eroded specimens. He also states that the nacre of his species is purple. The description therefore fits Lamarck's species perfectly, though I have never known the species to come from so far west as the Rio Grande—Conrad's locality.

Genus OBOVARIA Rafinesque, 1819.

(Type, *Unio retusa* Lamarck.)

Obovaria RAFINESQUE, J. de Phys. Chim. Hist. Nat., 1819, p. 426.[1]

Shell short, oval, rounded or retuse, solid, inflated, thick in front, thinner behind, with high beaks which are sculptured with very faint, irregular, often broken and slightly nodulous ridges which show a tendency to fall into two loops, the posterior often open behind; epidermis dull, brownish, silky or clothlike, rarely rayed, rays indistinct; female shell but slightly inflated in the post-basal region, commonly having a shallow furrow or a flattened area at the posterior end; pseudocardinals solid, stumpy; laterals short, club-shaped; anterior and posterior cicatrices deep and distinct; nacre bluish white or purple.

Animal with very short gills, the inner united to the abdominal sac throughout; marsupium projecting far below the rest of the branchiæ and occupying the posterior portion of the outer gills, dolabriform or kidney-shaped; mantle with a wide, thickened double-edged border, the inner edge of which is often slightly toothed at its postbasal part.

Subgenus OBOVARIA Rafinesque, 1819.

(Type, *Unio retusa* Lamarck.)

Shell retrose to short oval; beaks high, central; pseudocardinals rarely parallel with the laterals; cavity of the beaks deep, subcompressed; nacre bluish white or purple. Animal with the characters of the genus.

†OBOVARIA RETUSA Lamarck.

**Unio retusa* Lamarck, An. sans Vert., VI, 1819, p. 72.—FERUSSAC, Guer. Mag., 1835, p. 28.—DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 534; 3d ed., II, 1839, p. 668.

**Unio retusus* CONRAD, Monog., II, 1836, p. 19, pl. VIII.—*REEVE, Conch. Syst., I, 1841, p. 118, pl. LXXXVIII, fig. 16.—*HANLEY, Test. Moll., 1842, p. 202; *Biv. Shells, 1843, p. 202, pl. XXI, fig. 11.—*CATLOW and REEVE, Conch. Nom., 1845, p. 63.—*KUSTER Conch. Icon. Cab. Unio, 1852, p. 58, pl. XIII, fig. 2.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 256.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXXI, fig. 363.—*CALKINS, Pr. Ottawa Ac. Sci., 1874, p. 44.—*B. H. WRIGHT, Check List, 1888.—*P.ETEL, Conch. Sam., III, 1890, p. 165.—*CALL, Tr. Acad. Sci. St. Louis, VII, 1895, p. 45, pl. VIII.

**Margarita* (*Unio*) *retusus* LEA, Syn., 1836, p. 34; 1838, p. 23.

**Margaron* (*Unio*) *retusus* LEA, Syn., 1852, p. 35; 1870, p. 56.

**Unio torsus* POTIEZ and MICHAUD, Gall. Moll., 1844, p. 149, pl. LVII, figs. 1, 2.

Ohio, Cumberland, and Tennessee river systems.

[1] I am utterly unable to guess as to what Rafinesque's first species (*Obovaria oboralis*) is, and the second (*O. torsa*) is either the *Unio retusa* of Lamarck or a variety of Lea's *U. circulus* with purple nacre, I can not be certain which. Which of these two nearly related species it may be, I consider it sufficient to establish the genus, his description being applicable.

†OBOVARIA CIRCULUS Lea.

**Unio circulus* LEA, Tr. Am. Phil. Soc., III, 1829, p. 433, pl. IX, fig. 14;[1] *Obs., I, 1834, p. 47, pl. IX, fig. 14.—SHORT and EATON, Transylvania Jl., 1831, p. 77.—*DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 549; 3d ed., II, 1839, p. 672.—*ANTON, Verz. der Conch., 1839, p. 14.—*HANLEY, Test. Moll., 1842, p. 201; *Biv. Shells, 1843, p. 201, pl. XX, fig. 23.—*CATLOW and REEVE, Conch. Nom., 1845, p. 57.—*KUSTER, Conch. Cab. Unio, 1852, p. 41, pl. VIII, fig. 2.—*CHENU, Ill. Conch., 1858, pl. XVI, figs. 1, 1*a*, 1*b*.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—*REEVE, Conch. Icon., XVI, 1865, pl. XXVII, fig. 135.—*B. H. WRIGHT, Check List, 1888.

**Margarita* (*Unio*) *circulus* LEA, Syn., 1836, p. 33; 1838, p. 22.

**Margaron* (*Unio*) *circulus* LEA, Syn., 1852, p. 34; 1870, p. 55.

**Unio subrotundus* FERUSSAC, part, Guer. Mag., 1835, p. 28.[2]—CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 258.

**Unio subrotundus* Raf. v. *circulus* PÆTEL, Conch. Sam., III, 1890, p. 168.

**Mya rotunda* WOOD, Index Test. (Rev.), 1856, p. 199, pl. 1, Supp., fig. 1.

Ohio, Tennessee and Cumberland river systems; southeast Louisiana; Alabama and Tombigbee drainage? Reported from Michigan and the St. Lawrence drainage, but the forms in this area are probably *O. leibii*, which is perhaps only a variety of *O. circulus*.

†OBOVARIA TINKERI B. H. Wright.

**Unio tinkeri* B. H. WRIGHT, Nautilus, XIII, 1899, p. 7.

**Oboraria tinkeri* SIMPSON, Pr. Acad. Nat. Sci. Phila., 1900, p. 78, pl. IV, fig. 3.

Tombigbee River, Alabama; Columbus, Mississippi.

†OBOVARIA LENS Lea.[3]

**Unio lens* LEA, Tr. Am. Phil. Soc. Phila., IV, 1831, p. 80, pl. VIII, fig. 10; *Obs. I, 1834, p. 90, pl. VIII, fig. 10.—*FERUSSAC, Guer. Mag., 1835, p. 26.—*HANLEY, Test. Moll., 1842, p. 201; *Biv. Shells, 1843, p. 201, pl. XXI, fig. 4.—*CATLOW and REEVE, Conch. Nom., 1845, p. 60.—*CHENU, Ill. Conch., 1856, pl. VIII, figs. 10, 10*a*, 10*b*.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—*REEVE, Conch. Icon., XVI, 1865, pl. XXVII, fig. 134.—*SOWERBY, Conch., Icon., XVI, 1866, pl. XXXVII, fig. 200.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 157.

**Margarita* (*Unio*) *lens* LEA, Syn., 1836, p. 33; 1838, p. 22.

**Margaron* (*Unio*) *lens* LEA, Syn., 1852, p. 34; 1870, p. 55.

*†*Unio lævigatus* SAY, Am. Conch., VI, 1834.—CONRAD, New F. W. Shells, 1834, p. 70.—CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 251.

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[1] The figured type has a purple nacre.

[2] Ferussac makes this = *U. orbiculatus* Hildreth also.

[3] This is sometimes considered a synonym of *O. circulus*. The two species are excessively variable in form, and both often have a pink or purplish nacre. While individuals may occasionally be found which can only be referred to either species with doubt, the majority of specimens can readily be determined, and Dr. V. Sterki informs me that he has found differences in the animals of the two. As I have only been able to examine the soft parts of young specimens I have not detected any differential characters in them.

†OBOVARIA LENS var. DEPYGIS Conrad.

* *Unio depygis* CONRAD, Am. Jl. Conch., II, 1866, p. 107, pl. x, fig. 1.—B. H. WRIGHT, Check List, 1888.

Ohio River drainage; southern Michigan.

†OBOVARIA UNICOLOR Lea.[1]

* *Unio unicolor* LEA, Tr. Am. Phil. Soc., IV, 1845, p. 163; * Tr. Am. Phil. Soc., IX, 1848, p. 74, pl. IV, fig. 12; * Obs., IV, 1848, p. 48, pl. IV, fig. 12.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 259.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 171.

* *Margaron* (*Unio*) *unicolor* LEA, Syn., 1852, p. 34; 1870, p. 55.

Mississippi and Alabama, in streams flowing into the Gulf.

†OBOVARIA LEIBII Lea.[2]

* *Unio leibii* LEA, Proc. Acad. Nat. Sci. Phila., VI, 1862, p. 168; * Jl. Ac. N. Sci. Phila., VI, 1866, p. 44, pl. XV, fig. 42; Obs., XI, 1867, p. 48, pl. XV, fig. 42—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *leibii* LEA, Syn., 1870, p. 36.

Lake Erie and streams falling into it; southern Michigan; †Sequatchie River, Tennessee.

†OBOVARIA ROTULATA B. H. Wright.

* *Unio rotulatus* B. H. WRIGHT, Naut., XIII, 1899, p. 22.

* *Oboraria rotulata* SIMPSON, Pr. Ac. N. Sci. Phila., 1900, p. 78, pl. IV, fig. 2.

Escambia River, Escambia County, Florida.

Subgenus PSEUDOÖN Simpson, 1900.

(Type, *Unio ellipsis* Lea.)

Shell elliptical, inflated, solid, that of the males slightly pointed at the upper posterior part; epidermis brownish or blackish, rayless or very feebly rayed, beaks anterior; pseudocardinals solid, stumpy, or slightly elongate in age, and showing a tendency toward being parallel with the laterals; cicatrices deep; nacre silvery, iridescent posteriorly.

Animal with mantle having a wide, thickened, double border, the inner edge being toothed throughout below; gills small; marsupium not reaching to the posterior end of the outer branchiæ, though extending quite well forward; ovisacs rather numerous, large and distinct, tinted with purple below; anal and branchial openings finely toothed.

[1] The type is a young female, somewhat broken, and besides this Lea has a shell which he has so named that I believe is *O. castaneus*. Under the name of *Unio lens* (Cat. No. 85743, U.S.N.M.) he has a young shell from Jackson, Mississippi, which is a young male *unicolor*. The species grows to the size of *O. lens*, but shows dull rays and is more inflated than that species.

[2] Dr. Lea states that the type is from Erie County, Michigan. There is no county of that name in the State, and his specimens may be from Erie County, Ohio. I am very doubtful whether it is more than a dwarf variety of *U. circulus*, as specimens have been seen from Tennessee which seem to stand between the two forms.

†OBOVARIA ELLIPSIS Lea.

* ?*Unio brevialis* SOWERBY, Rec. and Foss. Shells, XVI, fig. (no date).

**Unio ellipsis* LEA, Tr. Am. Phil. Soc., III, 1828, p. 268, pl. IV, fig. 4; *Obs., I, 1834, p. 10, pl. IV, fig. 4.—SHORT and EATON, Transylvania Jl., 1831, p. 75.—* SAY, Am. Conch. I, No. II, 1831.—* DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 547; 3d ed., II, 1839, p. 672.—* HANLEY, Test. Moll., 1842, p. 188; * Biv. Shells, 1843, p. 188, pl. XXI, fig. 7.—* POTIEZ and MICHAUD, Gall. Moll., 1844, p. 150, pl. LVIII, figs. 1, 2.—* CATLOW and REEVE, Conch. Nom., 1845, p. 58.—* CHENU, Bib. Conch., 1st ser., III, 1845, p. 22, pl. IV, figs. 1, 1*a*, 1*b*.—* KUSTER, Conch. Cab. Unio, 1852, p. 43, pl. VIII, fig. 4.—* CHENU, Ill. Conch., 1858, pl. XVIII, figs. 1, 1*a*, 1*b*.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXX, figs. 4, 24.—* CALKINS, Pr. Ottawa Acad. Sci., 1874, p. 42.—* LATCHFORD, Tr. Ottawa Field Nat. Club, 1882, p. 50.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 151.

* *Margarita* (*Unio*) *ellipsis* LEA, Syn., 1836, p. 22; 1838, p. 18.

* *Margaron* (*Unio*) *ellipsis* LEA, Syn., 1852, p. 26; 1870, p. 41.

* *Unio triangularis* SAY, Am. Conch., VI, 1834.

* *Unio olivarius* CONRAD, New F. W. Shells, 1834, p. 70.—* FERUSSAC, Guer. Mag., 1835, p. 28.

* *Unio taitianus* SOWERBY, Conch. Icon., XVI, 1868, pl. LXVII, fig. 338.

* *Unio pealei* LEA, Pr. Ac. N. Sci. Phila., I, 1871, p. 191; *Jl. Ac. N. Sci. Phila., VIII, 1874, p. 26, pl. VIII, fig. 23; *Obs., XIII, 1874, p. 30, pl. VIII, fig. 23.—* B. H. WRIGHT, Check List, 1888.

Upper Mississippi system as far south as the Tennessee and Arkansas rivers; St. Lawrence drainage area.

†OBOVARIA CASTANEA Lea.

**Unio castaneus* LEA, Tr. Am. Phil. Soc., IV, 1831, p. 91, pl. XI, fig. 21;[1] *Obs., I, 1834, p. 101, pl. XI, fig. 21.—* CONRAD, New F. W. Shells, 1834, p. 68.—* FERUSSAC, Guer. Mag., 1835, p. 28.—* HANLEY, Test. Moll., 1842, p. 188; Biv. Shells, 1843, p. 188, pl. XXII, fig. 30.—* CATLOW and REEVE, Conch. Nom., 1845, p. 57.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 246.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* CHENU, Ill. Conch., 1858, pl. XI, figs. 5, 5*a*, 5*b*.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 147.

* *Margarita* (*Unio*) *castaneus* LEA, Syn., 1836, p. 22; 1838, p. 18.

* *Margaron* (*Unio*) *castaneus* LEA, Syn., 1852, p. 26; 1870, p. 41.

Streams flowing into the Gulf of Mexico, from the Alabama River west to the Nechez.

The following species are unfigured and indeterminable.

* *Obovaria cordata* RAFINESQUE, Ann. Gen. Sci. Brux., V, 1820, p. 312, pl. LXXXII, figs. 6, 7.

* *Obovaria stegaria* RAFINESQUE, Ann. Gen. Sci. Brux., V, 1820, p. 312, pl. LXXXII, figs. 4, 5.

[1] The name *castaneus* was applied to some *Unio* which I am unable to determine, by Rafinesque in a continuation of a monograph on the Bivalve Shells of the River Ohio, etc., in October, 1831. According to Scudder, Lea's name was published the latter part of the same year, but I have no means of knowing which appeared first. Under the circumstances I use Lea's name.

**Obovaria striata* RAFINESQUE, Ann. Gen. Sci. Brux., V, 1820, p. 311.

**Obovaria torsa* RAFINESQUE, Ann. Gen. Sci. Brux., V, 1820, p. 312, pl. LXXXII, figs. 1, 3.

**Obliquaria retusa* RAFINESQUE, Ann. Gen. Sci. Brux., V, 1820, p. 306, pl. LXXXI, figs. 19, 20.

Genus PLAGIOLA (Rafinesque, 1819) Agassiz.

(Type, *Unio securis* Lea.)

Plagiola RAFINESQUE, J. de Phys. Chim. Hist. Nat., 1819, p. 426.—AGASSIZ, Arch. für Nat., 1852, p. 48, redefined.

Shell triangular ovate, somewhat inflated, solid, with a distinct and often sharp posterior ridge; surface concentrically sculptured; umbonal area somewhat flattened; beaks high, sculptured with delicate, parallel, doubly looped ridges, the anterior loop rounded, the posterior angular; pseudocardinals ragged; laterals club-shaped, straight or slightly curved; cavity of the beaks moderate, often somewhat compressed; nacre silvery; female shell more or less inflated at postbasal region.

Animal with the outer gills narrow in front, wide behind; inner gills wide in front, posteriorly free or united to abdominal sac; marsupium occupying the posterior part of the outer gills, but not extending quite to the hinder end, consisting of well-marked ovisacs which are rounded below; a distinct sulcus extends the whole length of the kidney-shaped marsupium at the inside and outside at some distance above its base; mantle edge thickened and somewhat doubled, in some cases toothed or fringed below.

Subgenus PLAGIOLA (Rafinesque, 1819) Agassiz.

Shell solid, surface irregularly concentrically ridged; epidermis smoothish, but here and there wrinkled; painted with larger and smaller scattered rays, which are generally broken into irregular lunate or squarish blotches; hinge heavy and strong; hinge plate wide and flat; female shell smaller than the male, more inflated, and swollen at postbasal region.

Animal with the branchiæ rounded below, inner the larger, wholly or partly free from the abdominal sac; marsupium large, projecting far below the inner gills; mantle very thin, dark on its thickened, fringed double edge; anal opening with very small papillæ.

†PLAGIOLA SECURIS Lea.

* ? *Obliquaria* (*Plagiola*) *depressa* RAFINESQUE, Ann. Gen. Sci. Phys. Brux., 1820, p. 302, pl. XXXI, figs. 5-7.[1]

**Unio securis* LEA, Tr. Am. Phil. Soc., III, 1829, p. 437, pl. XI, fig. 17; *Obs., I, 1834, p. 437, pl. XI, fig. 17.—*DESHAYES, Encyc. Meth., II, 1830, p. 578.—SHORT and EATON, Transylvania Jl., 1831, p. 77.—*DESHAYES, An. sans

[1] Rafinesque's name *depressa*, for what is probably a male of this species, has precedence over Lea's name, but it was used previously by Lamarck for an Australian *Unio*. Rafinesque placed this species in his genus *Obliquaria* and the subgenus *Plagiola*, but after giving the name *Obliquaria depressa* he calls it *U. depressa* in parenthesis.

Vert., 2d ed., VI, 1835, p. 550; 3d ed., II, 1839, p. 673.—*HANLEY, Test. Moll., 1842, p. 184; *Biv. Shells, 1843, p. 184, pl. XX, fig. 51.—*CATLOW and REEVE, Conch. Nom., 1845, p. 64.—*CHENU, Ill. Conch., 1858, pl. XVI, figs. 4, 4*a*, 4*b*.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 496.—*CHENU, Man., II, 1859, p. 138, fig. 671.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXI, fig. 304.—*B. H. WRIGHT, Check List, 1888.

**Margarita* (*Unio*) *securis* LEA, Syn., 1836, p. 19; 1838, p. 16.

**Margaron* (*Unio*) *securis* LEA, Syn., 1852, p. 24; 1870, p. 37.

**Plagiola securis* SMITH, Bull. U. S. Fish Com., 1899, p. 291, pl. LXXX.

**Unio lineolata* SAY, Am. Conch., VI, 1834.

**Plagiola lineolata* AGASSIZ, Arch. für Nat., I, 1852, p. 48.

**Unio lineolatus* CONRAD, New F. W. Shells, 1834, p. 70.—*FERUSSAC, Guer. Mag. 1835, p. 28.—*CONRAD, Am. Conch. (continuation), VII, pl. LXVIII (no date).—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 251.—*KUSTER, Conch. Cab. Unio, 1861, p. 171, pl. LIII, figs. 1, 2.

Mississippi drainage south into Arkansas; west into eastern Iowa and Kansas; Tombigbee and Alabama river systems.

Subgenus **AMYGDALONAIAS** Crosse and Fischer. 1893.

(Type, *Unio cognatus* Lea.)

Shell inflated, decidedly truncated at the posterior slope, surface slightly concentrically sculptured; posterior ridge sharp and well defined; epidermis shining, sometimes wrinkled looped, and painted with a beautiful pattern of broken or arrow-marked rays; area of the beaks flattened off in the direction of the axis of the shell, but not compressed; beak sculpture delicate, somewhat broken and doubly looped, the anterior loop rounded, the posterior sharp below, the ribs fading out where they cross the posterior ridge; hinge delicate, pseudocardinals rather compressed, high, and ragged; hinge plate narrow; female shell very slightly swollen at post base.

Animal with branchiæ more or less free from the abdominal sac; marsupium consisting of numerous distinct ovisacs, and having a well-marked sulcus extending around it at some distance above its base; mantle thickened and doubled on its edge, which has dark papillæ.

(Group of *Plagiola elegans*.)

Shell short, triangular oval, inflated, with a very sharp posterior ridge, extending from the beaks to the hinder point of the shell; male and female shells scarcely distinguishable, both being much expanded in the basal region.

† **PLAGIOLA ELEGANS** Lea.

**Unio elegans* LEA, Tr. Am. Phil. Soc., IV, 1831, p. 83, pl. IX, fig. 13; *Obs., I, 1834, p. 93, pl. IX, fig. 13.—*HANLEY, Test. Moll., 1842, p. 183; *Biv. Shells, 1843, p. 183, pl. XXI, fig. 33.—*CATLOW and REEVE, Conch. Nom., 1845, p. 58.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—*CHENU, Ill. Conch., 1858, pl. XV, figs. 3, 3*a*, 3*b*; *Manual, II, 1859, p. 138, fig. 672.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXXIV, p. 380.—*CALKINS, Pr. Ottawa Ac. N. Sci., 1874, p. 42.—*B. H. WRIGHT, Check List, 1888.

**Margarita* (*Unio*) *elegans* LEA, Syn., 1836, p. 18; 1838, p. 16.

**Margaron* (*Unio*) *elegans* LEA, Syn., 1852, p. 23; 1870, p. 36.

**Plagiola elegans* BAKER, Moll. Chicago, Pt. 1, 1898, p. 91, pl. XXI, fig. 1.

Unio truncatus SAY, Am. Conch., VI, 1834.—* FERUSSAC, Guer. Mag., 1835, p. 27.—* CONRAD, Am. Conch. (continuation), Pt. 7, pl. LXVII (no date); * Pr. Ac. N. Sci. Phila., VI, 1853, p. 259.—* KUSTER, Conch. Cab., 1861, p. 174, pl. LV, figs. 2, 3.

* *Unio truncatus* RAFINESQUE var. *elegans*. * PÆTEL, Conch. Sam., III, 1890, p. 170.

Mississippi drainage generally; Michigan; Lake Michigan; southwest to Trinity River, Texas.

(Group of *Plagiola donaciformis*.)

Shell small, elongated, triangular oval; posterior ridge generally well defined but rarely sharp, having broken green rays which form chevrons or blotches on a lighter ground; female shell somewhat inflated in the post-basal region.

† PLAGIOLA DONACIFORMIS Lea.

* *Unio donaciformis* LEA, Tr. Am. Phil. Soc., III, 1828, p. 267, pl. IV, fig. 3; * Obs., I, 1834, p. 9, pl. IV, fig. 3.—* FERUSSAC, Guer. Mag., 1835, p. 27.—* DESHAYES, An. sans Vert. 2d ed., VI, 1835, p. 547; 3d ed., II, 1839, p. 672.—* HANLEY, Test. Moll., 1842, p. 183; * Biv. Shells, 1843, p. 183, pl. XXII, fig. 41.—* CATLOW and REEVE, 1845, p. 58.—* CHENU, Ill. Conch., 1858, pl. XI, figs. 4, 4*a*, 4*b*.—* B. H. WRIGHT, Check List, 1888.

* *Margarita* (*Unio*) *donaciformis* LEA, Syn., 1836, p. 18; 1838, p. 16.

* *Margaron* (*Unio*) *donaciformis* LEA, Syn., 1852, p. 24; 1870, p. 36.

* *Plagiola donaciformis* BAKER, Moll. Chicago, Pt. 1, 1898, p. 92, pl. XIII, fig. 4.

* *Unio zigzag* LEA, Tr. Am. Phil. Soc., III, 1829, p. 440, pl. XII, fig. 19; * Obs., I, 1834, p. 54, pl. XII, fig. 19.—SHORT and EATON, Transylvania Jl., 1831, p. 79.—* DESHAYES, An. sans Vert. 2d ed., VI, 1835, p. 551; 3d ed., II, 1839, p. 673.—* HANLEY, Test. Moll., 1842, p. 183; * Biv. Shells, 1843, p. 183, pl. XXII, fig. 42.—* CATLOW and REEVE, Conch. Nom., 1845, p. 65.—* KUSTER, Conch. Cab. Unio, 1852, p. 42, pl. VIII, fig. 3.—H. and A. ADAMS, Gen. Rec. Moll., 1857, p. 495.—*CHENU, Ill. Conch., 1858, pl. VIII, figs. 8, 8*a*, 8*b*; Man., 1859, II, p. 138, fig. 670.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXIX, fig. 213.—* CALKINS, Pr. Ottawa Ac. Sci., 1874, p. 46.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 172.

* *Margarita* (*Unio*) *zigzag* LEA, Syn., 1836, p. 18; 1838, p. 16.

* *Margaron* (*Unio*) *zigzag* LEA, Syn., 1852, p. 24; 1870, p. 36.

* *Unio nervosa* CONRAD, New F. W. Shells, 1834, p. 70.

* *Unio nervosus* SAY, Am. Conch., VI, 1834.—* FERUSSAC, Guer. Mag., 1835, p. 27.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 253.—* KUSTER, Conch. Cab. Unio, 1861, p. 175, pl. LV, fig. 4.

Mississippi drainage generally; Alabama River area; southwest to the Trinity River, Texas; Michigan. Seems to be gradually replaced in the southwest by *P. macrodon*, and there are specimens which can scarcely be assigned with certainty to either species.

† PLAGIOLA MACRODON Lea.

* *Unio macrodon* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 154; * Jl. Ac. N. Sci. Phila., VI, 1862, p. 193, pl. XXVI, fig. 262; *Obs., IX, 1863, p. 15, pl. XXVI, fig. 262.—* † SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXVIII, fig. 437.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 158.

* *Margaron* (*Unio*) *macrodon* LEA, Syn. 1870, p. 37.

Eastern Texas, northward probably into Kansas.

†PLAGIOLA COGNATA Lea.

* *Unio cognatus* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 306; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 368, pl. LXV, fig. 193; * Obs., VIII, 1860, p. 50, pl. LXV, fig. 193.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXIX, fig. 214.—* B. H. WRIGHT, Check List, 1888.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 602.
* *Margaron* (*Unio*) *cognatus* LEA, Syn., 1870, p. 43.

Rio Salado, New Leon, Mexico.

Subgenus PTYCHODERMA Simpson, 1900.

(Type, *Unio cyrenoides* Philippi.)

Shell triangularly ovate or rounded, solid, bluntly angled before, more sharply angular behind, with a tolerably well-marked posterior ridge; surface strongly and irregularly concentrically sulcate; beaks small but rather prominent, sculptured with fine, irregular, broken ridges, which are somewhat doubly looped, the front loop being larger and more rounded; epidermis olive to tawny, wrinkled, sometimes having faint rays; pseudocardinals compressed, ragged; hinge plate narrow; laterals short, slightly curved, obliquely striated; muscle scars rather shallow, the posterior round; female shell produced in post-basal region.

Animal with small branchiæ, inner united the whole length to the abdominal sac, wider than the outer in front, narrower behind; marsupium occupying the posterior part of the outer gills in from eleven to twenty distinct ovisacs which are rounded and dark below, the whole having a decided, parallel sulcus inside and out near its base; mantle thin, papery, with a wide, thickened, double edge, which is sometimes crenate; branchial opening large fringed; anal opening smooth or with only the faintest crenulations.[1]

(Group of *Plagiola cyrenoides*.)

Shell generally more or less covered with radiating grooves which cut up the concentric sculpture into looped wrinkles or nodules, sometimes having the appearance of dried, wrinkled paint, the sculpture extending into the substance of the shell; epidermis usually tawny or yellowish, rarely showing any vestiges of rays; female shell greatly produced in the post-basal region.

†PLAGIOLA CYRENOIDES Philippi.

* *Unio cyrenoides* PHILIPPI, Zeits. für Mal., IV, 1847, p. 93; *Abbild., III, 1848, p. 49, pl. V, fig. 1.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 248.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* KUSTER, Conch. Cab. Unio., 1862, p. 285, pl. XCVI, fig. 1.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 150.
* *Margaron* (*Unio*) *cyrenoides* LEA, Syn., 1852, p. 25; 1870, p. 38.

[1] In a female *P. cyrenoides*, which was not gravid, the sulcus near the base of the inside of the marsupium was quite deep, in fact the part above it hung over it in a sort of flap, which would no doubt disappear if it was filled with ova.

* † *Unio newcombianus* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 103; * Obs., VI, 1857, p. 32, pl. XXX, fig. 27; * Jl. Ac. N. Sci. Phila., III, 1858, p. 312, pl. XXX, fig. 27.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *newcombianus* LEA, Syn., 1860, p. 36.

* *Unio sagrinatus* SOWERBY, Conch. Icon., XVI, 1868, pl. LXVII, fig. 345.[1]—PÆTEL, Conch. Sam., III, 1890, p. 166.

Nicaragua; Venezuela? A specimen in the U. S. National Museum from the Morelet collection is marked with the latter locality.

† PLAGIOLA ENCARPA Lea.

* *Unio encarpus* LEA. Pr. Ac. N. Sci. Phila., XII, 1868, p. 95; * Jl. Ac. N. Sci. Phila., VI, 1868, p. 294, pl. XLII, fig. 105; * Obs., XII, 1869, p. 54, pl. XLII, fig. 105.—* B. H. WRIGHT, Check List, 1888.

Margaron (*Unio*) *encarpus* LEA, Syn., 1870, p. 35.

Nicaragua.

(Group of *Plagiola nicaraguensis*.)

Shell much like that of *cyrenoides*, but simply covered with coarse, irregular, concentric ridges, and having no radiating grooves or wrinkles, faintly rayed in umbonal region. Animal as in Cyrenoides group.

† PLAGIOLA NICARAGUENSIS Lea.

* *Unio nicaraguensis* LEA, Pr. Ac. N. Sci. Phila., XII, 1868, p. 95; * Jl. Ac. N. Sci. Phila., VI, 1868, p. 296, pl. XLIII, fig. 107; * Obs., XII, 1869, p. 56, pl. XLIII, fig. 107.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *nicaraguensis* LEA, Syn., 1870, p. 35.

* *Unio gabbianus* LEA, Pr. Ac., N. Sci. Phila., XII, 1868, p. 95; * Jl. Ac., N. Sci. Phila., VI, 1868, p. 295, pl. XLIII, fig. 106; * Obs., XII, 1869, p. 55, pl. XLIII, fig. 106.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *gabbianus* LEA, Syn., 1870, p. 35.

Nicaragua.

The following species are unfigured and indeterminable.

* *Unio nuculinus* PHILIPPI, Zeits. für Mal., V, 1848, p. 176.

Nicaragua. Probably near *cyrenoides*.

* *Unio* (*Plagiola?*) *imbricatus* MÖRCH, Mal. Bl., VII, 1861, p. 205.

Nicaragua. This may equal *encarpus* Lea.

DIGENÆ.

Male shell inflated, truncated posteriorly; female shell compressed, expanded into a broad wing behind the post ridge, the wing being filled with a flap of the mantle.

Genus TRITOGONIA Agassiz, 1852.

Tritogonia AGASSIZ, Arch. für Nat., 1852, p. 48.

Shell solid, elongate rhomboid, having a strong, irregular posterior ridge, obliquely truncated behind in the male, in the female this region is somewhat compressed and rounded; base incurved; whole surface

[1] Changed in errata by the author to *U. newcombianus*.

except the rounded wing of the females covered with pustules; beaks rather low, incurved and turned forward over the well-developed lunule, which is elongated and filled with epidermal matter; beak sculpture strong, consisting of irregular, subparallel ridges which are curved upward behind, and fine radiating ridges in front of and behind this; epidermis dark olive; hinge plate rather narrow; pseudocardinals strong, ragged; laterals long and straight, near to the pseudocardinals; adductor scars shallow; cavity of the beaks rather deep and compressed, female shell more compressed than that of the male.

Animal with the inner gills much larger than the outer, generally free for the most part from the abdominal sac; palpi enormous, elongated, united to each other behind, and to the mantle a part of their length; mantle thin, with a thickened, dark, double border, the inner edge often toothed throughout, the base much thickened at the posterior end and folded at the branchial opening; branchial opening large, with numerous crowded papillæ; anal opening smooth or with only fine denticulations; superanal opening long, closed below; in the female there is a thickened flap of the mantle which fills the circular posterior expansion of the shell, and which has a smaller flap inside; foot and abdominal sac large, the latter winged in front.[1]

†TRITOGONIA TUBERCULATA Barnes.

* *Unio tuberculatus* BARNES, Am. Jl. Sci., VI, 1823, p. 125, pl. VII, figs. 8*a* 8*b*.[2]—* HILDRETH, Am. Jl. Sci., XIV, 1828, p. 282.—SHORT and EATON, Transylvania Jl., 1831, p. 76.—* REEVE, Conch. Syst., I, 1841, p. 118, pl. LXXXVIII, fig. 5.—* HANLEY, Test. Moll., 1842, p. 182; *Biv. Shells, 1843, p. 182, pl. XX, fig. 27.—*POTIEZ and MICHAUD, Gall. Moll., 1844, p. 158, pl. LX, fig. 1.—* CATLOW and REEVE, Conch. Nom., 1845, p. 64.—* REEVE, Elements of Conch., 1860, II, pl. XXXIII, fig. 183.—* CALKINS, Pr. Ottawa Acad. Sci., 1874, p. 45.—*B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam , III, 1890, p. 170.

* *Margarita* (*Unio*) *tuberculatus* LEA, Syn., 1836, p. 17; 1838, p. 16.

* *Margaron* (*Unio*) *tuberculatus* LEA, 1852, p. 23; 1870, p. 34.

* *Mya tuberculata* EATON, Zool. Text-Book, 1826, p. 217.

* *Unio pustulata* SWAINSON, Treat. on Mal., 1840, p. 271, fig. 54*d*.

* *Unio gigas* SOWERBY,[3] Conch. Icon., XVI, 1867, pl. LVI, fig. 287.

[1] I have never seen a specimen among the hundreds examined that had young or ova in the gills. But I have seen spermatozoa in specimens with inflated shells and ova in those with the wing. Mr. H. M. Kelly, of Mount Vernon, Iowa, who has made a very careful study of the anatomy of many of our Unionidæ, assures me that the form with the compressed shell, having the expanded flap behind, is the female.

[2] It has been claimed that this species was previously described under the name of *Obliquaria verrucosa* by Rafinesque, but I am unable to make anything out of his figure or description; hence I use the name given by Barnes. Barnes's name was used by Rafinesque for the species which the former called *Unio verrucosus*, but as Rafinesque placed his species in *Obliquaria*, and as the generic names of both forms are changed in this work, I do not consider Barnes's name preoccupied.

[3] I think that this is a large, rather high male of the species in question. I can not find any description of *Unio gigas* by Swainson, to whom Sowerby credits this species, and the *Megadomus gigas* of Swainson (which, so far as I know, is undescribed) can not be it, as the latter says that his genus, *Megadomus*, has the lateral teeth imperfect, one or none. Treatise on Mal., p. 266.

* *Unio verrucosus* SAY, Am. Conch., VI, 1834.—* CONRAD, New F. W. Shells, 1834, p. 72.—* FERUSSAC, Guer. Mag., 1835, p. 27.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 259.—* KUSTER, Conch. Cab., 1862, p. 273, pl. XCII, fig. 1.—* SOWERBY, Conch. Icon., XVI, 1868, pl. I, fig. 4.

* *Tritogonia verrucosa* AGASSIZ, Arch. für. Nat., I, 1852, p. 48.

* *Tritigonia verrucosa* SMITH, Bull. U. S. Fish Com., 1899, p. 291, pl. LXXXI.

† TRITOGONIA TUBERCULATA var. OBESA Simpson.[1]

Mississippi drainage generally; streams falling into the Gulf of Mexico from the Alabama system west to central Texas.

† TRITOGONIA CONJUGANS B. H. Wright.

* *Unio conjugans* B. H. WRIGHT, Naut., XIII, 1899, p. 89.

* *Tritogonia conjugans* Simpson, Pr. Ac. N. Sci. Phila., 1900, p. 79, pl. IV, fig. 1.

Hiawassee River, Tennessee. A single male shell of this remarkable species, the type, is in the U. S. National Museum collection. I am not positive that it belongs here, though it probably does.

MESOGENÆ.

Male and female shells alike, short, solid, inflated; embryos occupying a few distinct ovisacs in the center of the outer gills.

Genus CYPROGENIA Agassiz, 1852.

(Type, *Unio irroratus* Lea.)

Cyprogenia AGASSIZ, Arch. für Nat., 1852, p. 47.

Shell solid, inflated, rounded triangular, sometimes slightly retuse, generally a little biangular behind; posterior ridge unusually well developed, especially in the young shell; umbonal region flattened parallel with the axis of the shell, sometimes compressed; beaks curved inward and forward, their sculpture very faint, consisting of slightly doubly looped ridges; sculpture of the shell nodular, radiately wrinkled, or lachrymose; ligament black and conspicuous; lunule distinct and well developed; epidermis shining, painted with a delicate, dark mottling on a light ground; hinge plate wide and flat; pseudocardinals heavy, triangular, blunt and ragged; laterals short, obliquely striated; cavity of the beaks not deep; adductor scars small, well impressed, those at the posterior round; nacre bright and silvery. Animal with inner gills partly free from the abdominal sac, rounded below; outer gills smaller; marsupium consisting of from seven to twenty-three very long, purple ovisacs pendent from near the central base of the outer gills, and formed into a close coil with the ends turned inwardly; branchial opening large with many small papillæ; anal opening smooth.

[1] A short, inflated, peculiarly formed shell from Big Eddy, Nechez River, Texas, having very few faint tubercles is in the U. S. National Museum collection, and may be a distinct species. It is certainly worthy of the varietal name here applied.

†CYPROGENIA IRRORATA Lea.

* *Unio irroratus* LEA, Tr. Am. Phil. Soc., III, 1830, p. 269, pl. v, fig. 5; * Obs., I, 1834, p. 11, pl. v, fig. 5.—SHORT and EATON, Transylvania Journ., 1831, p. 77.—* HANLEY, Test. Moll., 1842, p. 181; * Biv. Shells, 1843, p. 181, pl. XX, fig. 25.—* CATLOW and REEVE, Conch. Nom., 1845, p. 60.—* CHENU, Ill. Conch., 1858, pl. x, figs. 3, 3*a*, 3*b*.—* REEVE, Conch. Icon., XVI, 1864, pl. XII, fig. 44.—* B. H. WRIGHT, Check List, 1888.

* *Margarita* (*Unio*) *irroratus* LEA, Syn., 1836, p. 16; 1838, p. 15.

* *Margaron* (*Unio*) *irroratus* LEA, Syn., 1852, p. 22; 1870, p. 34.

* *Unio irrorata* DESHAYES, Encyc. Meth., II, 1830, p. 579.—* DESHAYES, An. sans. Vert., 2d ed., VI, 1835, p. 547; 3d ed., II, 1839, p. 672.

* *Theliderma irrorata*, SWAINSON, Tr. on Mal., 1840, p. 271, fig. 54*a*.

* *Unio verrucosus albus* HILDRETH, Am. Jl. Sci., XIV, 1828, p. 281.

* *Unio stegarius* SAY, Am. Conch., VI, 1834.—* CONRAD, New F. W. Shells, 1834, p. 71.—* FERUSSAC, Gner. Mag., 1835, p. 28.—* CONRAD, Monog., X, 1838, p. 83, pl. XLVI, fig. 1; * Pr. Ac. N. Sci. Phila., VI, 1853, p. 258.—* REEVE, Conch. Icon., XVI, 1864, pl. XI, fig. 45.

* *Unio stegarius* var. *irroratus* PÆTEL, Conch. Sam., III, 1890, p. 168.

†CYPROGENIA IRRORATA var. PUSILLA Simpson.[1]

Ohio, Cumberland, and Tennessee river systems; St. Francis and Saline rivers, Arkansas? Eastern Iowa? The specimens reported from the western localities may be *C. aberti.*

†CYPROGENIA ABERTI Conrad.

* *Unio aberti* CONRAD, Pr. Ac. N. Sci. Phila., V, 1850, p. 10; * VI, 1853, p. 244; Jl. Ac. N. Sci. Phila., 1854, p. 295, pl. XXVI, fig. 1.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *aberti* LEA, Syn. 1870, p. 34.

* *Unio lamarckianus* LEA, Tr. Am. Phil. Sci., X, 1852, p. 266, pl. XVII, fig. 20; * Obs., V, 1852, p. 22, pl. XVII, fig. 20.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 496.—* SOWERBY, Conch. Icon., XVI, 1868, pl. XCII, fig. 498.—* PÆTEL, Conch. Sam., III, 1890, p. 156.

* *Margaron* (*Unio*) *lamarckianus* LEA, Syn., 1852, p. 23.

* *Unio popenoi* CALL, Bull. Washb. Coll., I, 1885, p. 49, pl. II.

Kansas; Missouri; Indian Territory; Arkansas.

Genus OBLIQUARIA (Rafinesque 1820) Simpson

(Type, *Obliquaria reflexa* Rafinesque.)

Obliquaria RAFINESQUE, Ann. Gen. Sci. Phys. Brux., 1820, p. 301.

Shell inflated, solid, oval, ending in a tolerably sharp point behind, having a row of large, compressed, longitudinal knobs running from the beaks to the center of the base, those of one valve alternating in position with the knobs of the other, and a well-developed posterior ridge, the space between the ridge and knobs somewhat excavated; posterior slope and sometimes the entire shell more or less corrugately sculptured; beaks prominent, incurved and pointed slightly forward toward a tolerably well-developed lunule; beak sculpture strong, con-

[1] A peculiar, dwarfed variety, about one-half the size of the ordinary form and much inflated, from the Green River, Kentucky.

sisting of four or five heavy, parallel ridges, which fall low in front but are curved upward behind; epidermis smooth, generally shining, painted with numerous delicate, wavy, darker, broken rays; pseudocardinals strong, direct, and ragged; laterals short, nearly straight; anterior muscle scars small, the sides of the pit smooth, the bottom ragged; front part of the shell very solid, suddenly becoming rather thin just behind the knobs; male and female shells essentially alike.

Animal with small branchiæ, rounded below, inner the larger, free from the abdominal sac in part; marsupium consisting of a few distinctly marked ovisacs (4 to 7), occupying a position just behind the center of the outer gills, projecting far below the rest of the branchiæ, their bases rounded; mantle cut away at the thinner portion of the shell; anal opening smooth or having only minute crenulations.

†OBLIQUARIA REFLEXA Rafinesque.

* *Obliquaria* (*Quadrula*) *reflexa* RAFINESQUE, Ann. Gen. Sci. Phys., 1820, p. 306.—* CHENU, Bib. Conch., 1st Ser., III, 1845, p. 19.

* *Obliquaria reflexa* BAKER, Moll. Chicago, Pt. 1, 1898, p. 89, pl. XIV, fig. 5; XX, fig. 2.

* *Unio reflexus* SAY, Am. Conch., No. VI, 1834.—* CONRAD, New F. W. Shells, 1834, p. 71; * Monog., I, 1835, p. 7, pl. IV, fig. 1.—* FERUSSAC, Guer. Mag., 1835, p. 28.—* KUSTER, Conch. Cab. Unio, 1852, p. 52, pl. XI, fig. 2.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 256.—* REEVE, Conch. Icon., XVI, 1864, pl. VI, fig. 23.

* *Unio cornutus* BARNES,[1] Am. Jl. Sci., VI, 1823, p. 122, pl. IV, figs. 5, 5*a*, 5*b*, 5*c*.—* ? ANTON, Verz. der Conch., 1839, p. 14.—* HANLEY, Test. Moll., 1842, p. 179; Biv. Shells, 1843, p. 179, pl. XX, fig. 30.—* CATLOW and REEVE, Conch. Nom., 1845, p. 57.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* CALKINS, Pr Ottawa Ac. N. Sci., 1874, p. 41.—* B. H. WRIGHT, Check List, 1888.

* *Margarita* (*Unio*) *cornutus* LEA, Syn., 1836, p. 15; 1838, p. 15.

* *Margaron* (*Unio*) *cornutus* LEA, Syn., 1852, p. 22; 1870, p. 33.

* *Mya cornuta* EATON, Zool. Text-book, 1826, p. 216.

* *Theliderma cornuta* SWAINSON, Treat. on Mal., 1840, p. 269.

Unio torulosus SHORT and EATON, Transylvania Jl., 1831, p. 75.

*† ? *Unio philippsi* CONRAD,[2] Monog., I, 1835, p. 9, pl. V, fig. 1; * Pr. Ac. N. Sci. Phila., VI, 1853, p. 255.—* PÆTEL, Conch. Sam., III, 1890, p. 163.

* *Unio phillipsii* CATLOW and REEVE, Conch. Nom., 1845, p. 62.—* KUSTER, Conch. Cab. Unio, 1852, p. 50, pl. X, fig. 3.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* B. H. WRIGHT, Check List, 1888.

* *Margarita* (*Unio*) *phillipsii* LEA, Syn., 1836, p. 15; 1838, p. 15.

* *Margaron* (*Unio*) *phillipsii* LEA, Syn., 1852, p. 22; 1870, p. 33.

* *Unio philipsii* HANLEY, Test. Moll., 1842, p. 178; Biv. Shells, 1843, p. 178.

Mississippi drainage; Michigan; Alabama River; southwestwardly to central Texas.

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[1] I am sorry to have to place the very appropriate and well-known name of Barnes in the synonymy, but I believe that the description of Rafinesque for his *Obliquaria reflexa* defines this species and nothing else, and although it is not figured, I feel justified in using it.

[2] A singular shell having the general form of *reflexa*, but the knobs are much broken up. I have seen specimens which agree quite well with Conrad's fine figure, which I have no doubt represents an unusual form of Rafinesque's species, and they hardly seem to me to be a varity. I do not think the so-called type in the Philadelphia Academy of Natural Sciences is valid.

PTYCHOGENÆ.

Male and female shells essentially alike, embryos contained in distinct ovisacs with rounded bases, occupying the entire outer gills, which, when gravid, consist of a series of folds.

Genus PTYCHOBRANCHUS Simpson, 1900.

(Type, *Unio phaseolus* Hildreth.)

Ptychobranchus SIMPSON, Pr. Ac. N. Sci. Phila., 1900, p. 79.

Shell triangular, solid, sometimes becoming arcuate in old specimens, umbonal region rather elevated; beak sculpture consisting of faint, somewhat broken ridges which have a tendency to be doubly looped; posterior ridge rounded but well developed; epidermis usually painted with wavy hair line rays or broken, radiating bars, which show a tendency to form square spots; hinge plate rather wide and flat; pseudocardinals small, low, triangular and roughened; laterals club-shaped, remote; cavity of the beaks shallow; muscle scars rather deep. Animal with inner gills free all or part of their length from the abdominal sac; marsupium occupying the basal half of the whole length of the outer gills and hanging in from six to twenty beautiful folds; ovisacs distinct, each ending below in an enlarged, rounded bulb which has a colored spot in its center; mantle thin, with a dark, thickened border; branchial opening large, with very minute papillæ or crenulations, sometimes smooth; anal opening crenulate or smooth.

†PTYCHOBRANCHUS PHASEOLUS Hildreth.

* *Unio phaseolus* HILDRETH, Am. Jl. Sci., XIV. 1828, p. 283.[1]—SAY, Am. Conch., No. III, 1830, pl. XXII.—SHORT and EATON, Transylvania Jl., 1831, p. 77.—* HANLEY, Test. Moll., 1842, p. 207; Biv. Shells, 1843, p. 207, pl. XX, fig. 50.—* CHENU, Bib. Conch., 1st ser., III, 1845, p. 31, pl. IX, figs. 1–6.—* CATLOW and REEVE, Conch. Nom., 1845, p. 62.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXIII, fig. 378.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 163.

* *Margarita* (*Unio*) *phaseolus* LEA, Syn., 1836, p. 38; 1838, p. 25.

* *Margaron* (*Unio*) *phaseolus* LEA, Syn., 1852, p. 38; 1870, p. 61.

† * *Unio planulatus* LEA, Tr. Am. Phil. Soc., III, 1830, p. 431, pl. IX, fig. 13; * Obs., I, 1834, p. 45, pl. IX, fig. 13.—* DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 549.—* CHENU, Ill. Conch., 1858, pl. XIII, figs. 1, 1*a*, 1*b*; * Manual, 1859, II, p. 137, fig. 659.

* *Unio planulata* DESHAYES, An. sans Vert., 3d ed., II, 1839, p. 672.

* *Unio fasciolaris* CONRAD, New F. W. Shells, 1834, p. 69.—* FERUSSAC, Guer. Mag., 1835, p. 27.—* AGASSIZ, Arch. für Naturg., I, 1852, p. 50.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 249.—* KUSTER, Conch. Cab., 1861, p. 172, pl. LIV, figs. 1–4.

* *Unio camelus* LEA,[2] Tr. Am. Phil. Soc., V, 1834, p. 102, pl. XV, fig. 45; * Obs., I,

[1] Figure left out by the editor.

[2] Typically this form is quite distinct from the ordinary manifestation of the species, being very solid and much humped, but there seems to be every possible variation to the lighter, more compressed forms, and I do not think it is worthy of a varietal name.

1834, p. 214, pl. XV, fig. 45.—* FERUSSAC, Guer. Mag., 1835, p. 29.—* HANLEY, Test. Moll., 1842, p. 184; * Biv. Shells, 1843, p. 184, pl. XXI, fig. 54.—* CATLOW and REEVE, Conch. Nom., 1845, p. 56.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* SOWERBY, Conch. Icon., XVI, 1867, pl. LV, fig. 283.—* B. H. WRIGHT, Check List, 1888.—PÆTEL, Conch. Sam., III, 1890, p. 147.

* *Margarita* (*Unio*) *camelus* LEA, Syn., 1836, p. 19; 1838, p. 17.

* *Margaron* (*Unio*) *camelus* LEA, Syn., 1852, p. 24; 1870, p. 37.

* *Unio compressissimus* LEA,[1] Pr. Am. Phil. Soc., IV, 1845, p. 163; * Tr. Am. Phil. Soc., X, 1848, p. 81, pl. VIII, fig. 23; * Obs., IV, 1848, p. 55, pl. VIII, fig. 23.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 247.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch Sam., III, 1890, p. 148.

* *Margaron* (*Unio*) *compressissimus* LEA, Syn., 1852, p. 24; 1870, p. 37.

Ohio, Tennessee, and Cumberland river systems; peninsula of Michigan; Kansas; Arkansas; Indian Territory; Louisiana. It is quite probable that some of the specimens reported from the southwestern part of the range belong to the next species.

† PTYCHOBRANCHUS CLINTONENSIS Simpson.

* *Ptychobranchus clintonensis* SIMPSON, Pr. Ac. N. Sci. Phila., 1900, p. 79, pl. V, fig. 3.

Little Red River, Arkansas; Indian Territory(?); southwest Tennessee(?)

† PTYCHOBRANCHUS FOREMANIANUS Lea.

* *Unio foremanianus* LEA, Pr. Am. Phil. Soc., II, 1842, p. 224; * Tr. Am. Phil. Soc., VIII, 1842, p. 247, pl. XXVII, fig. 64; * Obs., III, 1842, p. 85, pl. XXVII, fig. 64.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 249.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* CHENU, Ill. Conch., 1858, pl. XXVI, figs. 1, 1*a*, 1*b*.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXVII, fig. 202.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 153.

* *Margaron* (*Unio*) *foremanianus* LEA, Syn., 1852, p. 23; 1870, p. 36.

* *Unio woodwardius* LEA,[2] Pr. Ac. N. Sci. Phila., IX, 1857, p. 170.

* *Unio woodwardianus* LEA, Jl. Ac. N. Sci. Phila., IV, 1859, p. 199, pl. XXIII, fig. 82; * Obs., 1859, p. 17, pl. XXIII, fig. 82.—* † REEVE, Conch. Icon., XVI, 1864, pl. XVI, fig. 73.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 172.

Margaron (*Unio*) *woodwardianus* LEA, Syn., 1870, p. 36.[3]

* *Unio velatus* CONRAD, Jl. Ac. N. Sci. Phila., 1853, p. 298, pl. XXVII, fig. 6; * Pr. Ac. N. Sci. Phila., VI, 1853 p. 259.

Alabama River drainage.

[1] The type is simply an old, stunted *phaseolus*, with nearly every vestige of epidermis eroded away.

[2] This is the name originally given by Dr. Lea. He afterward changed it to *woodwardianus*.

[3] I formerly thought *foremanianus* and *woodwardianus* distinct, but a large amount of material received from Mr. R. E. Call, from the Cahawba River, Alabama, shows that the two absolutely blend together, there being a great diversity of form, and some specimens show the capillary rays of *foremanianus* and the square spots of *woodwardianus*, while others are of a uniform tawny color.

†PTYCHOBRANCHUS TRINACRUS Lea.

* *Unio trinacrus* LEA, Pr. Ac. N. Sci., Phila., V, 1861, p. 59; * Jl. Ac. N. Sci., Phila., V, 1862, p. 86, pl. XII, fig. 235; * Obs., VIII, 1862, p. 90, pl. XII, fig. 235.—* SOWERBY, Conch. Icon., XVI, pl. LXXXI, fig. 428.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *trinacrus* LEA, Syn., 1870, p. 36.

Coosa River, Alabama.

†PTYCHOBRANCHUS GREENI Conrad.

* *Unio greeni* CONRAD, New F. W. Shells, 1834, p. 32, pl. IV, fig. 1, p. 69.—* FERUSSAC, Guer. Mag., 1835, p. 29.—* MÖLLER, Syn. Nov. Gen., 1836, p. 203.—* CONRAD, Monog., VIII, 1837, p. 69, pl. XXXVIII, fig. 2.—* HANLEY, Test. Moll., 1842, p. 191; * Biv. Shells, 1843, p. 191, pl. XXIV, fig. 6.—* CHENU, Bib. Conch., 1st ser., 1845, p. 17, pl. III, fig. 5.—* CATLOW and REEVE, Conch. Nom., 1845, p. 59.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 250.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XLVII, fig. 253.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 154.

* *Margarita* (*Unio*) *greeni* LEA, Syn., 1836, p. 24; 1838, p. 19.

* *Margaron* (*Unio*) *greeni* LEA, Syn., 1852, p. 27; 1870, p. 42.

†* *Unio simplex* LEA, Pr. Am. Phil. Soc., IV, 1845, p. 163; * Tr. Am. Phil. Soc., X, 1848, p. 76, pl. V, fig. 15; * Obs., IV, 1848, p. 50, pl. V, fig. 15.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL Conch. Sam., III, 1890, p. 167.

* *Margaron* (*Unio*) *simplex* LEA, Syn., 1852, p. 27; 1870, p. 42.

Black Warrior River, Alabama.

†PTYCHOBRANCHUS FLAVESCENS Lea.

* *Unio flavescens* LEA, [1] Pr. Am. Phil. Soc., IV, 1845, p. 163; Tr. Am. Phil. Soc., X, 1848, p. 72, pl. III, fig. 9; * Obs., IV, 1848, p. 46, pl. III, fig. 9.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 249.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *flavescens* LEA, Syn., 1852, p. 27; 1870, p. 43.

* *Unio flavescens* PÆTEL, Conch. Sam., III.

Black Warrior River, Alabama.

ESCHATIGENÆ.

Male and female shells alike; embryos in distinct, short ovisacs, forming a border to the entire outer gills.

Genus DROMUS Simpson, 1900.

(Type, *Unio dromus* Lea.)

Shell solid, rounded-triangular; beaks well forward, rather high; beak sculpture consisting of fine ridges running parallel with the growth lines, the furrows between the ridges interrupted at the posterior ridge; posterior ridge distinct; a series of humps runs from the beaks down to the central part of the base of the shell, which is otherwise sculptured by

[1] I have only seen a single shell of this, and it is not in the best condition. It may be only a form of *greeni*, but it is not so inflated or solid, and it has no rays.

irregular concentric ridges; epidermis beautifully painted by undulated, radiating, broken hair lines or fine maculations; hinge plate wide and flat; pseudocardinals triangular, small and low, ragged; laterals low, short, club-shaped; cavity of the beaks deep and compressed, dorsal muscle scars on the under side of the hinge shelf; adductor scars small; front part of the shell very thick, suddenly becoming thinner at the row of humps; male and female shells much alike.

Animal with the inner branchiæ much the larger, curved below, free from the abdominal sac; marsupium occupying the base of nearly the whole outer branchiæ in numerous rather indistinctly marked ovisacs, bases of the ovisacs slightly rounded; ova very minute; palpi small, curved; branchial opening very large, extending one-third of the way along the base, fringed with many brown papillæ; anal opening very large, finely crenulated.

†DROMUS DROMUS Lea.

* *Unio dromus* LEA, Tr. Am. Phil. Soc., V, 1834, p. 70, pl. X, fig. 29; * Obs., I, 1834, p. 182, pl. X, fig. 29.—* FERUSSAC, Guer. Mag., 1835, p. 29.—* CONRAD, Monog., X, 1838, p. 84, pl. XLVI, fig. 2.—* HANLEY, Test. Moll., 1842, p. 181; * Biv. Shells, 1843, p. 181, pl. XXIII, fig. 25.—* CATLOW and REEVE, Conch. Nom., 1845, p. 58.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 248.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 496.—* KUSTER, Conch. Cab. Unio, 1861, p. 172, pl. LIII, figs. 3, 4.—* REEVE, Conch. Icon., XVI, 1864, pl. VIII, fig. 29.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 151.

* *Margarita* (*Unio*) *dromus* LEA, Syn., 1836, p. 16; 1838, p. 16.

* *Cyprogenia dromus* AGASSIZ, Arch. für Naturg., I, 1850, p. 48.

* *Margaron* (*Unio*) *dromus* LEA, Syn., 1852, p. 23; 1870, p. 34.

Tennessee and Cumberland River systems.

† DROMUS CAPERATUS. Lea.[1]

* *Unio caperatus* LEA, Pr. Am. Phil. Soc., IV, 1845, p. 164; * Tr. Am. Phil. Soc., X, 1848, p. 75, pl. V, fig. 14; * Obs., IV, 1848, p. 75, pl. V, fig. 14.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 496.—* REEVE, Conch. Icon., XVI, 1864, pl. V, fig. 19.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 147.

* *Margaron* (*Unio*) *caperatus* LEA, Syn., 1852, p. 22; 1870, p. 34.

* *Unio abacoides* HALDEMAN,[2] Pr. Ac. N. Sci. Phila., III, 1846, p. 75; * Am. Jl. of Sci., II, 1846 (September), p. 274.

Tennessee River system.

DIAGENÆ.

Male and female shells alike; embryos contained in the outer gills in short ovisacs which run crosswise of the branchiæ, and are discharged entire into the water.

[1] Generally this form is more compressed and less humped than *D. dromus*, but I think it is probably only a variety of the latter.

[2] Haldeman only gave a brief description of his species, and it has never been figured. According to Lea it equals his *U. caperatus*, and I believe he is correct.

Genus STROPHITUS Rafinesque, 1820.

(Type, *Anodonta undulata* Say.)

Strophitus RAFINESQUE, Ann. Gen. Sci. Phys. Brux., 1820, p. 316.
Uniopsis AGASSIZ, Arch. für Naturg., 1852, p. 49.

Shell elliptical to rhomboid, inflated, subsolid, pointed or biangulate behind, with a low posterior ridge, which is sometimes double; beaks full, sculpture consisting of a few strong, concentric ridges, which curve sharply upward behind; epidermis rayed or rayless, shining; hinge line incurved in front of the beaks; teeth rudimentary, a vestigeal, compressed tooth in each valve, and sometimes a secondary tooth; laterals rarely present; muscle scars shallow.

Animal with the marsupium occupying the whole of the outer gills, consisting of short, horizontal ovisacs which run directly across the gills, and are discharged through the outer wall with the ovules in them; ovules ten to twenty-five in each ovisac, in one or two rows; inner gills the larger, free in part from the abdominal sac, or wholly united; mantle generally bordered behind with square, black spots; branchial opening with numerous papillæ; anal opening papillose or crenulate.[1]

†STROPHITUS EDENTULUS Say.

Alasmodonta edentula SAY, N. Harm. Diss., II, No. 22, 1829, p. 340.—* CONRAD, New F. W. Shells, 1834, p. 72.—* L. W. SAY, Terr. and Fluv. Shells, 1840, p. 10.

* *Anodonta edentula* FERUSSAC, Guer. Mag., 1835, p. 25.—* HANLEY, Test. Moll., 1842, p. 218.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 502.—* CALKINS, Pr. Ottawa Ac., 1874, p. 50.—* CLESSIN, Conch. Cab. Ano., 1873, p. 107, pl. XXX, figs. 5, 6.—* LATCHFORD, Tr. Ottawa F. N. Club, 1882, p. 55.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 179.

* *Margarita* (*Anodonta*) *edentula* LEA, Syn., 1836, p. 450; 1838, p. 30.

* *Anodon edentula* CATLOW and REEVE, Conch. Nom., 1845, p. 66.—* DE KAY, Zool. N. Y., Pt. 5, 1848, p. 201, pl. XVI, fig. 231.—* HARTMAN and MICHENER, Conch. Cest., 1874, p. 95, fig. 174.

* *Uniopsis edentula* AGASSIZ, Arch. für Naturg., I, 1852, p. 49.

* *Margaron* (*Anodonta*) *edentula* LEA, Syn., 1852, p. 49; 1870, p. 79.

* *Strophitus edentulus* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 263.—* BAKER, Moll. Chicago, Pt. 1, 1898, p. 67, pl. XII, figs. 5, 6; XVII, fig. 3.

* *Anodon rugosus* SWAINSON, Zool. Ill., 1st ser., II, pl. XCVI, 1822.

* *Anodonta rugosus* HANLEY, Biv. Shells, 1843, p. 217.

* *Anodonta undulata* HILDRETH, Am. Jl. Sci., XIV, 1828, p. 290.—* CLESSIN, Conch. Cab. Ano., 1873, p. 79, pl. XXVII, figs. 3, 5.

* *Anodon undulata* GOULD, Inv. of Mass., 1841, p. 120, fig. 79; 1870, p. 182, fig. 482.

* *Unio undulata* DESHAYES, Tr. Elem., II, 1853, p. 217, pl. XXX, figs. 8, 9.

* *Anodon undulatus* SOWERBY, Rich. Faun. Bor. Am., III, 1836, p. 316.—* SOWERBY, Conch. Icon., XVII, 1867, pl. XI, fig. 30.

* *Anodon areolatus* SWAINSON, Zool. Ill., 2d ser., I, 1829, pl. XVIII.

* *Anodonta areolatus* FERUSSAC, Guer. Mag., 1835, p. 25.

[1] In this remarkable group of mollusks the changes that take place in the gills when they are used as a marsupium only last as long as they are gravid. When the short ovisacs are discharged the gill becomes an ordinary gill again.

**Anodon marginata* FERUSSAC, Guer. Mag., 1835, p. 25.
**Anodonta ferussaciana* FERUSSAC, Guer. Mag., 1835, p. 25.
* †*Margarita* (*Anodonta*) *wardiana* LEA, Syn., 1836, p. 50; 1838, p. 30.
**Anodonta wardiana* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 46, pl. XIV, fig. 42; *Obs., II, 1838, p. 46, pl. XIV, fig. 42.—* TROSCHEL, Arch. für Nat., V, 1839, Pt. 2, p. 238.—* HANLEY, Test. Moll., 1842, p. 220; * Biv. Shells, 1843, p. 220.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* PÆTEL, Conch. Sam., III, 1890, p. 186.—* CATLOW and REEVE, Conch. Nom., 1845, p. 68.—* B. H. WRIGHT, Check List, 1888.
**Anodon wardiana* SOWERBY, Conch. Icon., XVII, 1867, pl. XXVIII, fig. 114.
**Margaron* (*Anodonta*) *wardiana* LEA, Syn., 1852, p. 49; 1870, p. 79.
**Anodonta virgata* CONRAD, Cover of Mon. No. 5, 1836.
**Strophitus virgatus* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 263.
**Anodon unadilla* DE KAY, Zool. of N. Y., Pt. 5, 1843, p. 199, pl. XV, fig. 228.
**Strophitus unadilla* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 263.
**Anodon undulata* GOULD, Inv. Mass., 1841, p. 120, fig. 79; * 1870, p. 182, fig. 79.
* †*Anodonta tetragona* LEA, Pr. Am. Phil. Soc., IV, 1845, p. 165; * Tr. Am. Phil. Soc., X, 1848, p. 82, pl. VIII, fig. 25; *Obs., IV, 1848, p. 56, pl. VIII, fig. 25.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* B. H. WRIGHT, Check List, 1888.
**Margaron* (*Anodonta*) *tetragona* LEA, Syn., 1852, p. 51; 1870, p. 81.
**Strophitus tetragona* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 263.
* †*Anodonta arkansasensis* LEA, Tr. Am. Phil. Soc., XI, 1852, p. 293, pl. XXIX, fig. 56; *Obs., V, 1852, p. 49, pl. XXIX, fig. 56.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 502.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 176.
**Margaron* (*Anodonta*) *arkansasensis* LEA, Syn., 1852, p. 50; 1870, p. 80.
**Strophitus arkansasensis* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 262.
* †*Anodonta shæfferiana* LEA, Tr. Am. Phil. Soc., X, 1852, p. 288, pl. XXVI, fig. 50; *Obs., V, 1852, p. 44, pl. XXVI, fig. 50.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* PÆTEL, Conch. Sam., III, 1890, p. 184.
**Margaron* (*Anodonta*) *shæfferiana* LEA, Syn., 1852, p. 51; 1870, p. 81.
**Strophitus schaefferiana* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 263.
**Anodonta shefferiana* CLESSIN, Conch. Cab. Ano., 1853, p. 243, pl. XVII, figs. 5–7.
**Anodon shafferianus* SOWERBY, Conch. Icon., XVII, 1870, pl. XXXV, fig. 143.
**Anodonta shafferiana* B. H. WRIGHT, Check List, 1888.
*†*Anodonta showalterii* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 307;* Jl. Ac. N. Sci. Phila., 1862, p. 215, pl. XXXIII, fig. 284; *Obs., IX, 1863, p. 37, pl. XXXIII, fig. 284.—* CLESSIN, Conch. Cab. Ano., 1874, p. 156, pl. LI, figs. 5, 6.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 184.
**Anodon showalterii* SOWERBY, Conch. Icon., XVII, 1870, pl. XXVII, fig. 104.
**Margaron* (*Anodonta*) *showalterii* LEA, Syn., 1870, p. 79.
**Alaemodon rhombica* ANTHONY, Am. Jl. Conch., I, 1865, p. 158, pl. XII, fig. 5.
**Margaritana rhombica* PÆTEL, Conch. Sam., III, 1890, p. 173.
**Anodonta salmonea* CLESSIN, Conch. Cab. Ano., 1873, p. 91, pl. XXIV, figs. 1, 2.

†STROPHITUS EDENTULUS var. PAVONIUS Lea.

**Anodonta pavonia* LEA, Tr. Am. Phil. Soc., VI, 1836, p. 78, pl. XXI, fig. 65; *Obs., II, 1838, p. 78, pl. XXI, fig. 65.—* TROSCHEL, Arch. für Nat., V, 1839, Pt. 2, p. 239.—* HANLEY, Test. Moll., 1842, p. 218.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 264.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* MUSGROVE, Phot. Conch., 1863, pl. I, fig. 9.—* CLESSIN, Conch. Cab. Ano., 1873, p. 156, pl. XXX, figs. 3, 4.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 183.
**Margarita* (*Anodonta*) *pavonia* LEA, Syn., 1838, p. 30.
**Anodon pavonia* DE KAY, Zool. of N. Y., Pt. 5, 1843, p. 203, pl. XL, fig. 358.—

* CATLOW and REEVE, Conch. Nom., 1845, p. 67.—* SOWERBY, Conch. Icon., XVII, 1870, pl. XXXII, fig. 128.

* *Margaron* (*Anodonta*) *paronia* LEA, Syn., 1852, p. 50; 1870, p. 79.

* *Strophitus paronius* BAKER, Moll. Chicago, Pt. 1, 1898, p. 68, pl. III, fig. 5; V, fig. 3.

* *Anodon annulatus* SOWERBY, Conch. Icon., XVII, 1867, pl. XVIII, fig. 67.

Entire Mississippi drainage; St. Lawrence system and south in streams draining into the Atlantic to North Carolina; north in the British possessions to Lake Winnipeg; southwest to central Texas; Tyner, Alabama.

†STROPHITUS UNDULATUS Say.[1]

Anodonta undulata SAY, Nich. Enc., II, 1816, pl. III, fig. 5.—SHORT and EATON, Transylvania Jl., 1831, p. 81.—* FERUSSAC, Guer. Mag., 1835, p. 25.—* C. B. ADAMS, F. W. and L. S. of Vt., 1842, p. 15.—* HANLEY, Test. Moll., 1842, p. 217; Biv. Shells, 1843, p. 217.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* LATCHFORD, Tr. Ot. F. N. Cl., 1882, p. 55.—* B. H. WRIGHT, Check List, 1888.—* H. CARPENTER, Naut., IV., 1890, p. 57.—* PÆTEL, Conch. Sam., III, 1890, p. 186.

* *Margarita* (*Anodonta*) *undulata* LEA, Syn., 1836, p. 50; 1838, p. 30.

* *Anodon undulata* CATLOW and REEVE, Conch. Nom., 1845, p. 68.

* *Alasmodonta undulata* C. B. ADAMS, Thompson's Hist. Vt., 1842, p. 165.

* *Margaron* (*Anodonta*) *undulata* LEA, Syn., 1852, p. 49; 1870, p. 79.

* *Strophitus undulatus* STIMPSON, Shells of N. Eng., 1851, p. 15.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 263.

* *Anodonta pennsylvanica* LAMARCK, An. sans Vert., VI, 1819, p. 86.—* STARK, Elem. Nat. Hist., II, 1828, p. 89.—* DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 567; 3d ed., II, 1839, p. 678.—* DELESSERT, Rec. Coq. Lam., 1841, pl. XIII, figs. 4*a*, 4*b*.—* CHENU, Ill. Conch., 1858, pl. III, figs. 5, 5*a*.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.

* *Anodon papyraceus* ANTHONY, Am. Jl. Conch., I, 1865, p. 161, pl. XV, fig. 2.—* SOWERBY, Conch. Icon., XVII, 1867, pl. XIV, fig. 46.

* *Anodonta papyracea* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 183.

* *Margaron* (*Anodonta*) *papyracea* LEA, Syn., 1870, p. 81.

* *Anodon quadriplicatus* SOWERBY, Conch. Icon., XVII, 1867, pl. XXVIII, fig. 110.

Northern New England to Virginia, in streams draining into the Atlantic. This species is reported from Manitoba, but it is probable that the specimens from that region are *S. edentulus*.

†STROPHITUS CONNASAUGAENSIS Lea.

* *Margaritana connasaugaensis* LEA, Pr. Ac. N. Sci. Phila., II, 1857, p. 135; * Jl. Ac. N. Sci. Phila., IV, 1859, p. 229, pl. XXXII, fig. 113; * Obs., VII, 1859, p. 47, pl. XXXII, fig. 113.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 172.

* *Margaron* (*Margaritana*) *connasaugaensis* LEA, Syn., 1870, p. 69.

* *Unio connasaughensis* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXVIII, fig. 474.

* *Margaritana connesaugensis* CLESSIN, Conch. Cab. Ano., 1875, p. 269, pl. LXXXI, figs. 7, 8.

[1] Much confusion exists concerning this and the preceding species. The *edentulus* is much the larger and solider shell; the *undulatus* being a small, thin form (Say's figure is only about half an inch long, from a young or very dwarf specimen), usually quite distinctly biangulate behind. The latter is confined to the Atlantic drainage, while the former is found in this area and in the Mississippi Valley.

*†*Margaritana alabamensis* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 41; *Jl. Ac. N. Sci. Phila., V, 1862, p. 104, pl. XVI, fig. 249; *Obs., VIII, 1862, p. 108, pl. XVI, fig. 249.—*CLESSIN, Conch. Cab. Ano., 1876, p. 264, pl. LXXX, fig. 5.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 172.

**Unio alabamensis* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXII, fig. 433.

**Margaron* (*Margaritana*) *alabamensis* LEA, Syn., 1870, p. 68.

Alabama River system.

†STROPHITUS SPILLMANII Lea.

**Margaritana spillmanii* LEA, Pr. Ac. N. Sci. Phila., II, 1858, p. 138; *Jl. Ac. N. Sci. Phila., V, 1862, p. 105, pl. XVII, fig. 252; *Obs., VIII, 1862, p. 109, pl. XVII, fig. 252.—*CLESSIN, Conch. Cab. Ano., 1876, p. 264, pl. LXXXII, figs. 5, 6.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 174.

**Unio spillmanii* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXII, fig. 435.

Tombigbee River, Mississippi.

†STROPHITUS TOMBIGBEENSIS Lea.

**Margaritana tombigbeensis* LEA, Pr. Ac. N. Sci. Phila., II, 1858, p. 138; *Jl. Ac. N. Sci. Phila., V. 1862, p. 107, pl. XVIII, fig. 255; *Obs., VIII, 1862, p. 111, pl. XVIII, fig. 255.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 174.

**Margaron* (*Margaritana*) *tombigbeensis* LEA, Syn., 1870, p. 68.

**Margaritana* (*Alasmodonta*) *tombigbeensis* CLESSIN, Conch. Cab. Ano., 1876, p. 268, pl. LXXXI, figs. 3, 4.

Tombigbee River, Mississippi.

†STROPHITUS GESNERII Lea.

**Margaritana gesnerii* LEA, Pr. Ac. N. Sci. Phila., II, 1858, p. 138; *Jl. Ac. N. Sci. Phila., V, 1862, p. 211, pl. XXXII, fig. 280; *Obs., IX, 1863, p. 33, pl. XXXII, fig. 280.—*B. H. WRIGHT, Check List, 1888.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXIV, fig. 446.

**Margaron* (*Margaritana*) *gesnerii* LEA, Syn., 1870, p. 67.

**Margaritana gesneri* PÆTEL, Conch. Sam., III, 1890, p. 173.

Uphaupee and Swamp creeks, Alabama.

†STROPHITUS ELLIOTTII Lea.

**Margaritana elliottii* LEA, Pr. Ac. N. Sci. Phila., II, 1858, p. 138; *Jl. Ac. N. Sci. Phila., IV, 1859, p. 226, pl. XXXI, fig. 108; *Obs., VII, 1859, p. 44, pl. XXXI, fig. 108.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 173.

**Margaron* (*Margaritana*) *elliottii* LEA, Syn., 1870, p. 68.

**Margaritana* (*Alasmodonta*) *elliottii* CLESSIN, Conch. Cab. Ano., 1876, p. 267, pl. LXXXII, figs. 3, 4.

*†*Margaritana elliptica* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 113; *Jl. Ac. N. Sci. Phila., V, 1862, p. 106, pl. XVIII, fig. 254; *Obs., VIII, 1862, p. 110, pl. XVIII, fig. 254.—B. H. WRIGHT, Check List, 1888.—PÆTEL, Conch. Sam., III, 1890, p. 173.

**Margaron* (*Margaritana*) *elliptica* LEA, Syn., 1870, p. 68.

**Margaritana* (*Alasmodonta*) *elliptica* CLESSIN, Conch. Cab. Ano., 1876, p. 270, pl. LXXXI, figs. 5, 6.

Columbus, Georgia; Columbus, Mississippi.

?STROPHITUS RADIATUS Conrad.

**Alasmodonta radiata* CONRAD, Am. Jl. Sci., XXV, 1834, p. 341, pl. 1, fig. 10.[1]

Small streams of southern Alabama.

HOMOGENÆ.

Male and female shells alike, oval to elongate; beak sculpture coarse; embryos filling the entire outer gills in the form of thick, smooth pads; the ovisacs not separated by sulci.

Genus ANODONTA (Bruguiere em.) Lamarck, 1799.

(Type, *Mytilus cygneus* Linnæus.)

Mya LINNÆUS, part, Syst. Nat., 1758, p. 1158.
Limnæa POLI, Test. Utriusque Sic., I, 1791, p. 31; II, 1795, p. 253.
Anodontites BRUGUIERE, Jl. Hist. Nat., I, 1792, p. 131.
Anodonta LAMARCK, Prodrome Class. Coq., 1799, p. 87.
Anodon OKEN, Lehrb. Nat. Zool., I, 1815, p. 238.
Anodontes CUVIER, Regne An., II, 1817, p. 472.

Shell elliptical, thin, inflated, often slightly winged posteriorly; beak sculpture consisting of rather numerous more or less parallel ridges, usually somewhat doubly looped, and becoming slightly nodulous on the loops; surface generally smooth, shining; hinge edentulous, reduced to a mere line, regularly curved; muscle scars rather faint; nacre dull.

Animal with the marsupium occupying the whole outer gills, when filled forming a smooth, very thick, liver-colored pad; gills free from the abdominal sac from one-half to their entire length; palpi generally large; branchial opening papillose; anal opening without papillæ, though sometimes very slightly crenulate; superanal opening generally small, widely separated from the anal.

(Group of *Anodonta cygnea*.)

Shell very evenly rounded in front, pointed behind, the point elevated above the base, more or less winged on post dorsal part, the line from the posterior part of the wing to the hinder point usually incurved; beaks flattened, the sculpture consisting of numerous more or less concentric ridges, which are sometimes broken up into rather irregular corrugations.

Animal with the inner gills the larger, free from the abdominal sac nearly or quite their whole length; palpi large.

[1] I can make nothing out of this, the figure being poor and the description meager. Conrad places it in *Strophitus* in his Synopsis, 1853.

†ANODONTA CYGNEA Linnæus.[1]

**Mytilus cygneus* LINNÆUS,[2] Syst. Nat., 10th ed., 1758, I, p. 706, No. 1158.—*MÜLLER, Vermium, II, 1774, p. 208.—*DA COSTA, Hist. Nat. Test. Brit., 1778, p. 214, pl. XV, fig. 2.—*GMELIN, Syst. Nat., 13th ed., 1778, p. 3335.—*SCHRÖTER, Flussconch., 1779, p. 162, pl. III, fig. 1; *Ein. Conch., III, 1783, p. 440.—*OLIVI, Zool. Adr., 1792, p. 125.—*DONOVAN, Brit. Shells, II, 1800, pl. LV.—MONTAGU, Test. Brit., 1803, p. 170.—TURTON, Brit. Faun., 1807, p. 165.—*MATON and RACKETT, Tr. Linn. Soc. Lond., VIII, 1807, p. 109, pl. III, figs. 2, 3.—*SCHUMACHER, Ess. Nouv. Syst., 1817, p. 106.—*DILLWYN, Cat., 1817, p. 315.—TURTON, Conch. Dict. 1819, p. 115.—*SHEPPARD, Tr. Linn. Soc. Lond., XIII, 1820, p. 84, pl. V, fig. 3.—*WOOD, Ind. Test., 1825, p. 58, pl. XII, fig. 32*f*.—*HANLEY, Ipsa Linn. Conch., 1855, p. 487.—*WOOD, Ind. Test. Rev., 1856, p. 69, pl. XII, fig. 32*f*.

**Anodontes cygneus* CUVIER, Regne An., II, 1817, p. 472.

**Anodon cygneus* TURTON, Conch. Ins. Brit., 1822, p. 239.—*FLEMING, Hist. Brit. Moll., 1828, p. 415.—*TURTON, Man. L. and F. W. Shells, 1831, p. 17, fig. 8.—*BROWN, Land and F. W. Conch., 1836, p. 99, pl. XI, figs. 1-3*c*.—*THOMPSON, Ann. and Mag. N. Hist., VI, 1840, p. 196.—*BROWN, Ill. Rec. Conch., 1844, p. 79, pl. XXVIII, etc.—*TURTON, Man. L. and F. W. Shells, 1857, p. 271, fig. 65, pl. I, fig. 8.—*TATE, L. and F. W. Moll. Brit., 1866, pl. I.—*SOWERBY, Conch. Icon., XVII, 1870, pl. I, fig. 2.

**Anodonta cygnea* DRAPARNAUD, Hist. Moll. Fr., 1806, p. 134, pl. XII, fig. 1; pl. XI, fig. 6.—*MILLET, Moll. Maine et Loire, 1813, p. 76.—*GAERTNER, Vers. Syst., 1813, p. 38.—*BRARD, Hist. Coq. Paris, 1815, p. 234, pls. IX, X.—*KLEES, Desc. Test., 1818, p. 43.—*LAMARCK, An. sans Vert., VI, 1819, p. 84.—*C. PFEIFFER, L. and S. Moll., 1821, Pt. 1, p. 111, pl. V, fig. 4.—BOSC, Hist. Nat. Coq., 1824, III, p. 142.—*BLAINVILLE, Man., 1825, p. 358, pl. LXVI, fig. 1.—*WAARDENBERG, Com. Hist. Nat. An., 1827, p. 37.—*STARK, Nat. Hist., 1828, II, p. 89.—*GUERIN, Icon. Regne An., II, 1829, pl. XXVIII, fig. 5.—*ROSSMASSLER, Icon., I, 1835, p. 111, pl. III, fig. 67, etc.—*GOUPIL, Hist. Moll. Sarthe, 1835, p. 81.—*WYATT, Man. Conch., 1838, p. 68, pl. XI, fig. 2.—*PORRO, Mal. Como., 1838, p. 110.—*GRAS, Moll. Isere, 1840, p. 70, pl. VI, fig. 7.—*HANLEY, Test. Moll., 1842, p. 216; *Biv. Shells, 1843, p. 216.—*SCHOLZ, Schleis. L. and W. Moll., 1843, p. 118.—*MORELET, Moll. Port., 1845, p. 100.—*PUTON, Moll. Vosges, 1847, p. 68.—*GASSEIZ, Moll. Ag., 1849, p. 189.—*STEIN, Die Leb. Schneck., 1850,

[1] The number of specific names bestowed on the Anodontas of Europe must run up into the thousands. I have gone over the literature as carefully as possible, and large series of specimens from many localities, and I confess that I am absolutely unable to separate these forms specifically. The variations of form, size, color, solidity, and even texture are sufficient for a large number of species if they were not everywhere connected by intermediate examples. The new school of conchologists has named every conceivable variation, and in very many cases distorted individuals. Europe is a densely settled region, and it is possible that the waters of the streams and ponds in many places may be so affected by sewage and other offal as to produce many changes in the mollusks living in them. I shall attempt to recognize a few of the leading forms as varieties, referring them to the author originally describing them, but on account of the enormous amount of literature pertaining to these forms and its confused condition, I can not attempt to trace out these varieties among the descriptions of subsequent writers.

[2] According to Hanley (Shells of Linnæus, p. 144) the *A. cygnea* var *cellensis* of Rossmassler (Icon., IV, 1830, pl. XIX, fig. 280) is marked for this in the Linnæan cabinet. It is a large, rather elongated shell, slightly biangulate behind, somewhat cut away on the upper posterior part, and having fairly full beaks.

p. 100.—* DROUET, Nay. Fr., 1852, p. 5, pl. 1; * Rev. et Mag., IV, 1852, p. 55.—* DUPUY, Hist. Moll. Fr., 1852, p. 601, pl. XV, fig. 14.—* FORBES and HANLEY, Hist. Brit. Moll., II, 1853, p. 155, pl. XXXIX, fig. 3; XL, figs. 2, 3; XLI.—* KUSTER, Conch. Cab. Ano., 1853, p. 58, pl. XV.—VON WAHL, Arch. für Natur K. Liv., 2d ser., I, 1855, p. 133.—* MOQUIN-TANDON, Moll. Fr., II, 1855, p. 557, pl. XLIV.—* VON WAHL, Suss. Biv. Liv., 1855, p. 133.—* NORDENSKIÖLD and NYLANDER, Fin. Moll., 1856, p. 90, pl. VII, fig. 78.—H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 502; III, pl. CXVIII, figs. 1, 1*a*, 1*b*.—* CHENU, Man., 1859, II, p. 145, fig. 718.—* SOWERBY, Ill. Index Brit. Shells, 1859, pl. VII, No. 4.—REEVE, Elements of Conch., II, 1860, pl. P, No. 4.—* JEFFREYS, Brit. Conch., I, 1862, p. 41.—* REEVE, L. and F. W. Moll. Br., 1863, p. 215, fig. 1.—* BIELZ, Faun. Sieben, 1863, p. 195.—* HOUGHTON, Int. Obs., 1864, p. 68, pl. [1], figs. 1, 2.—* BROT, Etudes Nayades, Leman, 1867, p. 28, pl. I, fig. 1; pl. II, figs. 1, 2.—* KOBELT, Faun. Nass. Moll., 1871, p. 247.—* WESTERLUND, Faun. S. N. and D., 1873, p. 583.—DROUET, Mem. Acad. Dijon, VIII, 1882, p. 25 (reprint).—* L. ADAMS, Coll. Manual, 1884, p. 21, pl. II, fig. 1.—* PÆTEL, Conch. Sam., III, 1890, p. 178.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 199.—* LOCARD, Coq. de Fr., 1893, p. 234.—* WESTERLUND, Act. Soc. F. and F. F., XIII, No. 7, 1897, p. 168.

Symphynota cygnea LEA, Tr. Am. Phil. Soc. 1830, p. 456; Obs., I, 1834, p. 70.

**Margarita* (*Anodonta*) *cygnea* LEA, Syn., 1836, p. 48; 1838, p. 29.

**Anodon cygnea* CROUCH, Ill. Int. Lam., 1827, pl. IX, fig. 6. CATLOW and REEVE, Conch. Nom., 1845, p. 66.

**Margaron* (*Anodonta*) *cygnea* LEA, Syn., 1852, p. 47; 1870, p. 76.

**Anodonta cygnæa* GASSEIS, Moll. Ag., 1849, p. 189.

**Anodonta radiatus* MÜLLER, Vermium, 1774, p. 209.

**Mytilus zellensis* GMELIN, Syst. Nat., 13th ed., I, 1788, p. 3262.

**Anodonta zellensis* WAARDENBERG, Hist. Nat. Animalium, 1827, p. 37.

**Anodonta cellensis* C. PFEIFFER, Deuts. L. and Suss. Moll., I, 1821, p. 110, pl. VI, fig. 1.—* BOSC, Hist. Nat. Coq., III, 1824, p. 144.—* ROSSMASSLER, Icon., IV, 1836, p. 22, pl. XIX, fig. 280.—* SCHOLZ, Schleis. L. and W. Moll., 1843, p. 119.—* STABILE, Faun. Lug., 1845, p. 58, pl. II, fig. 69.—* TROSCHEL, Arch. für Nat., XIII, Pt. 1, 1847, p. 272.—* DES MOULINS, Actes. Soc. L. Bord, XVIII, 1852, p. 495.—* DROUET, Rev. et Mag., IV, 1852, p. 60.—* DUPUY, Nay. Fr. No. 2, 1852, p. 11, pl. II.—* KUSTER, Conch, Cab. Ano., 1853, p. 16, pl. IV, fig. 3; V, figs. 1–4; VI, fig. 1.—* BIELZ, Faun. Sieben., 1863, p. 197.—* BROT, Coq. Leman, 1867, p. 33, pl. III, figs. 1–3; IV, figs. 1, 2; VI, fig. 4.—* SCHRENCK, Reis. und F. Am. L., II, 1867, p. 722.—* KOBELT, Faun. Nass. Moll., 1871, p. 251.—* LEHMAN, Die Schneck., 1873, p. 297.—* PÆTEL, Conch. Sam., III, 1890, p. 177.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 211.

**Anodonta variabilis* DRAPARNAUD, Tab. Moll. Fr., 1801, p. 108.—FOURNEL, Faun. Moselle, I, 1836, p. 487.

* *Mytilus avonensis* MONTAGU, Test. Brit., 1803, p. 172.—* TURTON, Conch. Dict., 1819, p. 116.—* WOOD, Ind. Test. Rev., 1856, p. 69, pl. XII, fig. 34.

* *Anodon avonensis*, TURTON, Conch. Ins. Brit., 1822, p. 211.

* *Anodonta avonensis* MOQUIN-TANDON, Moll. France, II, 1855, p. 562, pl. XLVI, figs. 7, 8.

* *Mytilus avoensis* TURTON, Brit. Faun., 1807, p. 165.

* *Mytilus stagnalis* TURTON, Brit. Faun., 1807, p. 165.—* DILLWYN, Cat. I, 1817, p. 316.—TURTON, Conch. Dict., 1819, p. 115.

**Anodonta stagnalis* BOSC, Hist. Nat. Coq., III, 1824, p. 143.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 199.—* LOCARD, Coq. Fr., 1893, p. 228.

* *Mytilus fucatus* DILLWYN, Cat. I, 1817, p. 317.

* *Anodonta sulcata* LAMARCK, An. sans Vert., VI, 1819, p. 85.—* NILSSON, Hist. Moll. Svec., 1822, p. 113.—* DESHAYES, Enc. Meth., II, 1827, p. 147, pl. CCII.—* KLEE-

BERG, Moll. Bor., 1828, p. 36.—* DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 566; 3d ed., II, 1839, p. 678.—* HANLEY, Biv. Shells, 1843, p. 216.

* *Anodonta intermedia* LAMARCK, An. sans Vert., VI, 1819, p. 86.—* C. PFEIFFER, Deuts. L. and S. Moll., 1821, Pt. 1, p. 113, pl. VI, fig. 3.—* NILSSON, Hist. Moll. Svec., 1822, p. 117.—* WAARDENBERG, Hist. Nat. Animalium, 1827, p. 37.—* DESHAYES, Enc. Meth., II, 1827, p. 147, pl. CCI, fig. 2.—* PÆTEL, Conch. Sam., III, 1890, p. 180.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 74.—* LOCARD, Coq. de Fr., 1893, p. 263.

* *Anodon intermedia* CATLOW and REEVE, Conch. Nom., 1845, p. 67.

* *Anodon intermedius* KENYON, Mag. Nat. Hist., I, 1829, p. 426, fig. 185.

* *Mytilus incrassatus* SHEPPARD, Tr. Linn. Soc. Lond., XIII, 1820, p. 85, pl. V, fig. 4.

* *Anodonta incrassata* LOCARD, Coq. de Fr., 1893, p. 260.

* *Mytilus macula* SHEPPARD, Tr. Linn. Soc. Lond., XIII, 1820, p. 86, pl. V, fig. 6.

* *Anodon paludosus* TURTON, Conch. Ins. Brit., 1822, p. 240, pl. XV, fig. 6.

* *Anodonta piscinalis* NILSSON, Hist. Moll. Svec., 1822, p. 116.—* ROSSMASSLER, Icon., IV, 1836, p. 23, pl. XIX, fig. 281, etc.—* HANLEY, Biv. Shells, 1843, p. 216.—* GASSIES, Moll. Agen., 1849, p. 191, pl. IV, fig. 1.—* DROUET, Rev. et Mag., IV, 1852, p. 285.—* DUPUY, Hist. Moll. Fr., 1852, p. 612, pl. XXI, figs. 17, 18.—* DROUET, Nay. France, No. 5, 1852, p. 11, pl. V, fig. 1.—* DES MOULINS, Actes Soc. L. Bord., XVIII, 1852, p. 496.—* KUSTER, Conch. Cab. Ano., 1853, p. 45, pl. III, figs. 4, 5.—* MOQUIN-TANDON, Moll. Fr., II, 1855, p. 561, pl. XLV, figs. 5, 6; XLVI, figs. 1, 1*a*.—* KOBELT, Faun. Nass. Moll., 1871, p. 249.—* LEHMAN, Die Schnecken, 1873, p. 300.—* PÆTEL, Conch. Sam., III, 1890, p. 183.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 284; * Kong. Svensk. Vet. 1876, XIV, No. 12, p. 66.

* *Anodonta ventricosa* C. PFEIFFER, Deuts. L. and Suss, Moll., Pt. 2, 1825, p. 30, pl. III, figs. 1-6.—* DROUET, Rev. et Mag., IV, 1852, p. 58; Nay. France, No. 2, 1852, p. 6.—* KUSTER, Conch. Cab. Ano., 1853, p. 56, pl. XI, figs. 3-5.—* BROT, Coq. Fam. Nay. Lem., 1867, p. 32.—* DROUET, Mem. Ac. Dij., 3d ser., VII, 1882, p. 29 (reprint).—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 203.—* LOCARD, Coq. de Fr., 1893, p. 230.

Anodonta minima MILLET, Mem. Soc. Agr., Aug., 1833, p. 241, pl. XII, fig. 2.—* CATLOW and REEVE, Conch. Nom., 1845, p. 67.—* DUPUY, Hist. Moll. Fr., 1852, p. 611, pl. XX, fig. 20.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 277.—* LOCARD, Coq. de Fr., 1893, p. 307.

Anodonta oblonga MILLET, Mem. Soc. Agr., Aug., 1833, p. 242, pl. XII.—* DROUET, Rev. et Mag., IV, 1852, p. 63; Nay. Fr., No. 2, 1852, p. 14; His. Moll. Fr., 1852, p. 65, pl. XVIII, fig. 13.—* WESTERLUND, Faun. Pal., II. Pt. 7., 1890, p. 215.—* LOCARD, Coq. de Fr., 1893, p. 273.

* *Anodon oblongus* SOWERBY, Conch. Icon., XVII, 1867, pl. XV, fig. 54.

* *Anodonta attenuata* HELD, Isis, 1836, p. 280.

* *Anodonta exulcerata* PORRO, Mal. Como., 1838, p. 111, pl. II, fig. 12.—* CATLOW and REEVE, Conch. Nom., 1845, p. 66.—* SOWERBY, Conch. Icon., XVII, 1870, pl. XXXIII, fig. 131.—* CLESSIN, Conch. Cab. Ano., 1874, p. 127, pl. XL, figs. 3, 4.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 262.—* LOCARD, Coq. de Fr., 1893, p. 289.

* *Anodonta coarctata* POTIEZ and MICHAUD, Gall. Moll., 1844, p. 142, pl. LV, fig. 2.—* DUPUY, Hist. Moll. Fr., 1852, p. 616, pl. XX, fig. 51.

* *Anodonta elongata* POTIEZ and MICHAUD, Gall. Moll., 1844, p. 141, pl. LV, fig. 1.—* PUTON, Moll. Vosges, 1847, p. 69.—* DUPUY, Hist. Moll. Fr., 1852, p. 620, pl. XVI, fig. 16.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 307.

* *Anodonta glabra* STABILE, Faun. Lug., 1845, p. 58, pl. II, fig. 68.[1]—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 257.

* *Anodonta lusitana* MORELET, Moll. Port., 1845, p. 103, pl. XII, fig. 1.—* CLESSIN,

[1] Credited to Ziegler by Stabile.

Conch. Cab. Ano., 1873, p. 85. pl. XXIII, fig. 1.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 256.

**Anodonta regularis* MORELET, Moll. Port., 1845, p. 100, pl. X.—* CLESSIN, Conch. Cab. Ano., 1873, p. 85, pl. XXIII, fig. 2.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 208.

**Anodonta macilenta* MORELET, Moll. Port., 1845, p. 102.—* CLESSIN, Conch. Cab. Ano., 1873, p. 87, pl. XXIV, fig. 2.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 227.—* PÆTEL, Conch. Sam., III, 1890, p. 181.

**Anodonta ranarum* MORELET, Moll. Port., 1845, p. 104, pl. XII, fig. 2.—* CLESSIN, Conch. Cab. Ano., 1873, p. 86, pl. XXIII, fig. 3.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 217.

**Anodonta atrovirens* PHILIPPI, Menke's Zeits., 1848, p. 130.—* SOWERBY, Conch. Icon., XVII, 1867, pl. XIII, fig. 41.

**Anodonta milletii* RAY and DROUET, Rev. Zool., 1848, p. 3, pl. I, figs. 1–2.—* DUPUY, Hist. Moll. Fr., 1852, p. 617, pl. XXI, fig. 16.—* DROUET, Nay. France, 1852, p. 15.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 502.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 291.—* LOCARD, Coq. de Fr., 1893, p. 296.

**Anodonta grateloupiana* GASSIES, Moll. Agenais, 1849, p. 193, pl. II, figs. 13–15; pl. III, fig. 1, 1B; pl. IV, fig. 2.—* DES MOULINS, Actes Soc. L. Bord., XVIII, 1852, p. 496.—* PÆTEL, Conch. Sam., III, 1890, p. 180.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 303.

* *Pseudonodonta grateloupiana* BOURGNIGNET, Mat. Moll. Aceph., I, 1881, p. 29.

**Anodonta dupuyi* RAY and DROUET, Rev. Zool., 1849, p. 32, pls. I, II.—* DROUET, Rev. et Mag., 1849, p. 11, pl. II, figs. 1–2; * Nay. Fr., 1852, pl. VII.—* DUPUY, Hist. Moll. Fr., 1852, p. 606, pl. XVII, fig. 13.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 234.—* LOCARD, Coq. de Fr., 1893, p. 254.

Anodonta rayi DROUET, Cat. Extram., 1849, No. 35.—* DUPUY, Hist. Moll. Fr., 1852, p. 614, pl. XX, fig. 22.—* SOWERBY, Conch. Icon., XVII, 1867, pl. XIX, fig. 72.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 254.—* LOCARD, Coq. de Fr., 1893, p. 276.

* *Anodonta idrina* SPINELLI, Cat. Moll. Bresc., 1851, p. 19, pl. I, fig. 1.—* CLESSIN, Conch. Cab. Ano., 1875, p. 167, pl. LV, figs. 1, 2.—* KOBETT, Icon., IV, 1876, p. 67, pl. CXX, figs. 1156–1159.—* CLESSIN, Moll. Oest., 1887, p. 712, fig. 484.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 258.

* *Anodonta arelatensis* DUPUY, Hist. Moll. Fr., 1852, p. 611, pl. XIX, fig. 14.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 264.

* *Anodontites europæ* LEACH, Syn. Moll. Gt. Br., 1852, p. 326.

**Anodonta moulinsiana* DUPUY, Hist. Moll. Fr., 1852, p. 614, pl. XX, fig. 19.—* DES MOULINS, Actes Soc. L. Bord., XVIII, 1852, p. 494.—* DROUET, Nay. Fr., 1854, p. 5.—* KOBELT, Icon., VI, 1879, p. 45, pl. CLXV, fig. 1055.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 217.

* *Anodonta normandi* DUPUY, Hist. Moll. Fr., 1852, p. 620, pl. XVI, fig. 15.—* SOWERBY, Conch. Icon., XVII, 1870, pl. XXVIII, fig. 109.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 303.

* *Anodonta parvula* DROUET, Nay. Fr., No. 5, 1852, p. 9, pl. IV, fig. 2.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 265.—* LOCARD, Coq. de Fr., 1893, p. 283.

**Anodonta rossmassleriana* DUPUY, Hist. Moll. Fr., 1852, p. 608, pl. XVIII, fig. 14.—* DROUET, Nay. Fr., No. 5 and 6, 1854, p. 6.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 237.—LOCARD, Coq. de Fr., 1893, p. 266.

**Anodonta subponderosa* DUPUY, Hist. Moll. Fr., 1852, p. 607, pl. XVII, fig. 14.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 234.—* LOCARD, Coq. de Fr., 1893, p. 252.

**Anodonta tenella* KUSTER, Conch. Cab. Ano., 1852, p. 63, pl. IX, fig. 5.

**Anodonta scaldiana* DUPUY, Hist. Moll. Fr., 1852, p. 613, pl. XIX, fig. 12.—* KOBELT, Icon., VII, 1880, p. 35, pl. CXCIV, fig. 1960.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 251.—* LOCARD, Coq. de Fr., 1893, p. 272.

**Anodonta luxata* KUSTER, Conch Cab. Ano., 1853, p. 9, pl. III, fig. 1.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 238; LOCARD, Coq. de Fr., 1893, p. 267.

**Anodonta callosa* KUSTER, Conch. Cab. Ano., 1853, p. 36, pl. IX, fig. 1.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 270.

**Anodonta cariosa* KUSTER, Conch. Cab. Ano., 1853, p. 43, pl. IV, fig. 3; V, fig. 1; X, figs. 1, 2.—* DROUET, Mem. Ac. Dij., VII, 1882, p. 27 (reprint).—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 216.—* LOCARD, Coq. de Fr., 1893, p. 236.

**Anodonta arealis* KUSTER, Conch. Cab. Ano., 1853, p. 47, pl. IX, figs. 2-4.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 263.—* LOCARD, Coq. de Fr., 1893, p. 280.

**Anodonta charpentieri* KUSTER, Conch. Cab. Ano., 1853, p. 49, pl. XI, figs. 3, 4.—* SOWERBY, Conch. Icon., XVII, 1867, pl. XII, fig. 37.

**Anodonta anserirostris* KUSTER, Conch. Cab. Ano., 1853, p. 55, pl. X, fig. 3; XI, figs. 1, 2.—* DROUET, Mem. Ac. Dij., VII, 1882, p. 28.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 214.

**Anodonta inornata* KUSTER, Conch. Cab. Ano., 1853, p. 42, pl. III, fig. 6.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 238.—* LOCARD, Coq. de Fr., 1893, p. 267.

**Anodonta tumida* KUSTER, Conch. Cab. Ano., 1853, p. 48, pl. XII, figs. 1, 2.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 240.

**Anodonta subluxata* KUSTER, Conch. Cab. Ano., 1853, p. 52, pl. XIII, figs. 1, 2.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 258.—* LOCARD, Coq. de Fr., 1893, p. 287.

* *Anodonta sondermannii* KUSTER, Conch. Cab. Ano., 1853, p. 54, pl. XIII, fig. 4.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 240.

* *Anodonta opalina* KUSTER, part, Conch. Cab. Ano., 1853, p. 60, pl. XVI, figs. 1, 2.—* DROUET, Mem. Ac. Dij., VII, 1882, p. 30 (reprint).—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 284.

* *Anodonta nilssonii* KUSTER, part, Conch. Cab. Ano., 1853, p. 61, pl. XVIII, fig. 2.[1]

* *Anodonta helvetica* BOURGUIGNAT, Rev. et Mag., XV, 1863, p. 22 (pl. XX in vol. XIV, figs. 1, 2).—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 249.

* *Anodonta melinia* BOURGUIGNAT, Moll. peu. Con., 1863, p. 50, pl. XXVIII.—* BOURGUIGNAT, Rev. et Mag., 1865, pl. XXIV, figs. 1-5.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 229.

* *Anodonta elachista* BOURGUIGNAT, Moll. peu. Con., 1863, p. 60, pl. XXXI, figs. 12-14.

* *Anodonta psammita* BOURGUIGNAT, Rev. et Mag., XV, 1863, p. 21 (pl. XXI in vol. XIV, figs. 1-4).—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 269.

* *Anodonta pictetiana* BROT, Etude Coq. Lem., 1867, p. 45, pl. VIII, figs. 1-3.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 288.

* *Anodon simplicidus* SOWERBY, Conch. Icon., XVII, 1867, pl. XII, fig. 40.

†ANODONTA CYGNEA var. ANATINA Linnæus.[2]

**Mytilus anatinus* LINNÆUS, Syst. Nat., 10th ed., I, 1758, No. 1168.—* MÜLLER, Vermium, 1774, p. 207.—* DA COSTA, Hist. Nat. Test. Brit., 1778, p. 2151, pl. XV, fig. 2.—* SCHRÖTER, Flussc., 1779, p. 160, pl. I, figs. 2, 3; * Ein. Conch., III, 1783, p. 442.—* CHEMNITZ, Conch. Cab., VIII, 1785, p. 189, pl. LXXXVI, fig. 763.—* GMELIN, Syst. Nat., 13th ed., 1788, p. 3355.—* OLIVI, Zool. Adr., 1792, p. 125.—* DONOVAN, Brit. Shells, IV, 1802, pl. CXIII.—* MONTAGU, Test. Brit., 1803, p. 171.—* TURTON, Brit. Faun., 1807, p. 165.—* MATON and RACKETT, Tr. Linn. Soc. Lond., VIII, 1807, p. 110, pl. III*a*, figs. 1, 4.—* SCHUMACHER, Ess.

[1] Kuster's two figures on Plate XVII, which he gives for this species, are the *A. footiana* Lea. This figure is *A. cygnea*.

[2] According to Hanley (Shells of Linnæus, p. 144), the *Anodonta complanata* in Rossmassler, Icon., Pt. 4, Plate XX, fig. 283, is contained in the box in the Linnæan collection marked *anatina*. This is a rather small, compressed form, slightly angular in front and behind.

Nouv. Syst., 1817, p. 107, pl. I, fig. 5.—* DILLWYN, Cat., I, 1817, p. 317.—TURTON, Conch. Dict., 1819, p. 116.—* SHEPPARD, Tr. Linn. Soc. Lond., XIII, 1820, p. 85, pl. V, fig. 5.—* WOOD, Ind. Test., 1825, p. 58, pl. XII, fig. 33*c*.—* HANLEY, Ipsa. Linn. Conch., 1855, pl. 487, pl. II, fig. 1.—* WOOD, Ind. Test. Rev., 1856, p. 69, pl. XII, fig. 33.

**Anodon anatinus* TURTON, Conch. Ins. Brit., 1822, p. 240.—* SOWERBY, Rec. and Fos. Sh., XVII, 1823, fig.—* FLEMING, Hist. Brit. Moll., 1828, p. 415.—* REEVE, Conch. Syst., I, 1841, p. 121, pl. XCI, figs. 1, 2.

**Anodonta anatina* DRAPARNAUD, Hist. Moll. Fr., 1806, p. 135, pl. XII, fig. 2.—* GAERTNER, Vers. Syst., 1813, p. 37.—* MILLET, Moll. Maine et Loire, 1813, p. 75.—KLEES, Desc. Test., 1818, p. 42.—* LAMARCK, An. sans Vert., VI, 1819, p. 85.—* C. PFEIFFER, Deuts. L. und S. Moll., 1821, Pt. 1, p. 112, pl. VI, fig. 2.—* NILSSON, Hist. Moll. Svec., 1822, p. 114.—* BOSC, Hist. Nat. Coq., III, 1824, p. 143, pl. XXIII, fig. 1.—* WAARDENBERG, Com. Hist. N. An., 1827, p. 37.—STARK, Nat. Hist., II, 1828, p. 89.—* KLEEBERG, Moll. Bor., 1828, p. 37.—* ROSSMASSLER, Icon., V and VI, 1837, p. 57, pl. XXIX, figs. 417-420.—* PORRO, Mal. Como., 1838, p. 109.—* HANLEY, Test. Moll., 1842, p. 216; Biv. Shells, 1843, p. 216.—* STABILE, Faun. Lug., 1845, p. 57, pl. II, fig. 67.—* PUTON, Moll. Vosg., 1847, p. 68.—* GASSIES, Moll. Ag., 1849, p. 190.—* MIDDENDORFF, Sib. Reise, II, 1851, p. 283, pl. XXI, fig. 4; XXIX, figs. 5, 6.—* DROUET, Rev. et Mag., IV, 1852, p. 244; Nay. Fr., 1852, p. 4, pl. IV, fig. 1.—* DUPUY, Hist. Moll. Fr., 1852, p. 610, pl. XIX, fig. 13.—* FRIELE, Norsk. L. Fersk. Moll., 1853, p. 54.—* VON WAHL, Suss. Biv. Liv., 1855, p. 122.—* MOQUIN-TANDON, Moll. Terr. et Fl. Fr., II, 1855, p. 558, pl. XLV, figs. 1, 2.—* JEFFREYS, Brit. Conch., I, 1862, p. 43.—* SCHRENCK, Reis. und Forsch. Am. L., II, 1867, p. 721.—BROT, Etude Nay. Lem., 1867, p. 38, pl. III, fig. 4; V, fig. 2; VI, figs. 1-3; VII, figs. 1-3.—* LEHMAN, Die Schneck., 1873, p. 303.—* WESTERLUND, Faun. S. N. and D., 1873, p. 587.—* CLESSIN, Conch. Cab. Ano., 1876, p. 83, pl. XIV, figs. 3, 4; XXVI, figs. 1, 2.—* L. ADAMS, Coll. Man., 1884, p. 21, pl. II, fig. 2.—* PÆTEL, Conch. Sam., III, 1890, p. 176.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 225.—* LOCARD, Coq. de Fr., 1893, p. 275.

**Anodon anatina* CATLOW and REEVE, Conch. Nom., 1845, p. 66.

'*nodonta complanata* ROSSMASSLER,[1] Icon., I, 1835, p. 112, pl. III, fig. 68, IV, p. 24, pl. XX, fig. 283.—SCHOLZ, Schleis. L. und W. Moll., 1843, p. 123.—* KUSTER, Conch. Cab. Ano., 1853, p. 12, pl. III, figs. 2, 3.—* DROUET, Nay. Fr., 1854, p. 8, pl. VII, fig. 1.—* MOQUIN-TANDON, Moll. Terr. et Fluv. Fr., II, 1855, p. 560, pl. XLV, figs. 3, 4.—* VON WAHL, Arch. für Nat. Kund. Liv., 2d ser., I, p. 115.—* WESTERLUND, Faun. S. N. & D., 1873, p. 586.—* CLESSIN, Nach. Mal. Ges., 1874, p. 85;[2] Deuts. Ex. Moll., 1876, p. 446, fig. 292.—* KOBELT, Icon., VI, 1879, p. 44, pl. CLXV, fig. 1650-1654.—* DROUET, Mem. Ac. Dij., VII, 1882, p. 24 (reprint).—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 301.—* PÆTEL, Conch. Sam., III, 1890, p. 178.

**Anodon complanatus* SOWERBY, Conch. Icon., XVII, 1867, pl. IX, fig. 21

† ANODONTA CYGNEA var. PONDEROSA C. Pfeiffer.

**Anodonta ponderosa* C. PFEIFFER, Deuts. L. und S. Moll., 1825, Pt. 2, p. 31, pl. IV, figs. 1-6.—* WAARDENBERG, Com. Hist. Nat. An., 1827, p. 37.—* KLEEBERG, Moll. Bor., 1828, p. 37.—* ROSSMASSLER, Icon., IV, 1836, p. 24, pl. XX, fig. 282.—PORRO, Mal. Como., 1838, p. 112.—* HANLEY, Biv. Shells, 1843, p. 216.—SCHOLZ,

[1] Credited to Ziegler Museum by Rossmassler. It was published under the name *Anodonta compressa* in Menke's Synopsis, 1831, but not described.

[2] According to Clessin in this paper this is the only European species distinct from *A. cygnea*.

Schl. L. & W. Moll., 1843, p. 122.—* DUPUY, Hist. Moll. Fr., 1852, p. 604, pl. XVIII, fig. 12.—* KUSTER, Conch. Cab. Ano., 1853, p. 13, pl. IV, fig. 1.—* DROUET, Nay. Fr., 1854, p. 2, pl. VI.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 233.

† ANODONTA CYGNEA var. ROSTRATA Rossmassler.[1]

* *Anodonta rostrata* ROSSMASSLER, Icon., IV, 1836, p. 25, pl. XX, fig. 284.[2]—* CATLOW and REEVE, Conch. Nom., 1845, p. 67.—* STABILLE, Faun. Lug., 1845, p. 59, pl. II, fig. 70.—* DROUET, Rev. et Mag., IV, 1852, p. 288; Nay. Fr., 1852, p. 14, pl. V, fig. 2.—* KUSTER, Conch. Cab. Ano., 1853, p. 14, pl. IV, fig. 2.—* BOURGUIGNAT, Rev. et Mag., XV, 1863, p. 23, (also XIV, pl. XXI, fig. 5.)—* DROUET, Mem. Ac. Dij., VII, 1882, p. 37 (reprint).—* PÆTEL, Conch. Sam., III, 1890, p. 184.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 246.

* *Anodon rostratus* SOWERBY, Conch. Icon., XVII, 1867, pl. II, fig. 4.

Europe generally; Siberia; southward, perhaps, into Asia Minor. It has been reported from the Amoor River drainage, but I presume that the specimens from that region belong to the group of *A. woodiana*.

ANODONTA RETTERI Drouet.

* *Anodonta retteri* DROUET, Jl. de Conch., 1899, p. 402, fig.

Pond in the palace of the governor of Samarcand, Turkestan; very much like varieties of *A. cygnea*.

† ANODONTA LUCASI Deshayes.[3]

* *Anodonta lucasi* DESHAYES, Hist. Nat. Moll. Alg., 1848, pl. CVIII, figs. 1, 2.—* MORELET, J. de Conch., II, 1851, p. 359.—* BOURGUIGNAT, Mal. Alg., 1864, II, p. 296, pls. XXIII, XXIV, fig. 1.—* SOWERBY, Conch. Icon., XVII, 1867, pl. XVII, fig. 64.—* PÆTEL, Conch. Sam., III, 1890, p. 181.

* *Margaron* (*Anodonta*) *lucasii* LEA, Syn., 1870, p. 78.

* *Anodonta embia* BOURGUIGNAT, Mal. Alg., 1864, II, p. 297, pl. XXV.—* PÆTEL, Conch. Sam., III, 1890, p. 179.

Algiers.

ANODONTA CILICIA Kobelt.

† *Anodonta cilicia* KOBELT, Icon. 1st Supp., 1895, p. 24, pl. VII*a*, fig. 1.

Cilicia, north of Tarsus.

ANODONTA NUMIDICA Bourguignat.

* *Anodonta numidica* BOURGUIGNAT, Mal. Alg., 1864, II, p. 298, pl. XXIV, figs. 2–6.—* PÆTEL, Conch. Sam., III, 1890, p. 182.

* *Anodonta letourneauxi* BOURGUIGNAT, Mal. Alg., 1864, II, p. 299, pl. XXVI, figs. 2–6.—* PÆTEL, Conch. Sam., III, 1890, p. 181.

Algiers.

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[1] Credited by Rossmassler to Kokeil Museum.

[2] There is an *Anodonta rostrata* Held in Isis, 1836, page 280. I do not know whether it or that of Rossmassler was published first, or whether the two are the same or not.

[3] Probably a valid species, yet some specimens apparently belonging to it are certainly very much like forms of *cygnea*.

ANODONTA SUBCIRCULARIS Clessin.[1]

**Anodonta subcircularis* CLESSIN, Conch. Cab. Ano., 1873, p. 87, pl. XXII, figs. 3, 4.

Scutari Lake, European Turkey.

ANODONTA VESCOIANA Bourguignat.

**Anodonta vescciana* BOURGUIGNAT, Ann. Mal., II, 1857, p. 34, pl. I, figs. 1, 2.—* CLESSIN, Conch. Cab. Ano., 1873, p. 100, pl. XXIX, figs. 1, 2.—* KOBELT, Icon., VII, 1880, p. 83, pl. CCVII, fig. 2102.—* PÆTEL, Conch. Sam., III, 1890, p. 186.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 201.

**Margaron* (*Anodonta*) *vescoiana* LEA, Syn., 1870, p. 81.

Asia Minor.

† ANODONTA BERINGIANA Middendorff.

**Anodonta cellensis* SCHRÖTER var. *beringiana* MIDDENDORFF, Sib. Reise, II, 1851, p. 284, pl. XXVIII, figs. 4–7; XXIX, figs. 1–4.—* CLESSIN, Conch. Cab. Ano., 1875, p. 211, pl. LXV, figs. 1, 2.

**Anodonta youconensis* LEA, Pr. Ac. Nat. Sci. Phila., XI, 1867, p. 81.

**Anodonta youkanensis* LEA, Jl. Ac. Nat. Sci. Phila., VI, 1868, p. 287, pl. XL, fig. 99; Obs., XII, 1869, p. 47, pl. XL, fig. 99.—* CLESSIN, Conch. Cab. Ano., 1874, p. 133, pl. XLIII, figs. 1, 2.—* B. H. WRIGHT, Check List, 1888.

**Margaron* (*Anodonta*) *youkanensis* LEA, Syn., 1870, p. 80.

**Anodonta youkanensis* PÆTEL, Conch. Sam., III, 1890, p. 186.

Kamtschatka; Alaska.[2]

† ANODONTA KENNERLYI Lea.

**Anodonta kennerlyi* LEA, Pr. Ac. Nat. Sci. Phila., IV, 1860, p. 306; * Jl. Ac. Nat. Sci. Phila., V, 1862, p. 108, pl. XVIII, fig. 256; * Obs., VIII, 1862, p. 112, pl. XVIII, fig. 256.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 181.

**Anodon kennerlyi* SOWERBY, Conch. Icon., XVII, 1870, pl. XXXIV, fig. 139.

**Margaron* (*Anodonta*) *kennerlyi* LEA, Syn., 1870, p. 79.

Puget Sound; British Columbia.

† ANODONTA OREGONENSIS Lea.

**Anodonta oregonensis* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 80, pl. XXI, fig. 67; * Obs., II, 1838, p. 80, pl. XXI, fig. 67.—* TROSCHEL, Arch. für Nat., VI, 1839; II, p. 239.—* CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 264.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* CLESSIN, Conch. Cab. Ano., 1874, p. 170, pl. LVI, figs. 5, 6.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 182.

* *Margarita* (*Anodonta*) *oregonensis* LEA, Syn., 1837, p. 30.

* *Anodon oregonensis* CATLOW and REEVE, Conch. Nom., 1845, p. 67.—* GOULD and CARPENTER, Pr. Zool. Soc. Lond., 1856, p. 218.—* SOWERBY, Conch. Icon., XVII, 1867, pl. XVII, fig. 63.

* *Margaron* (*Anodonta*) *oregonensis* LEA, Syn., 1852, p. 49; 1870, p. 78.

* *Anodon cognata* GOULD, Proc. Bost. Soc. Nat. Hist., III, 1850, p. 294.

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[1] It is very hard to say what this is, as it is evidently a diseased shell. Probably a member of the *Cygnea* group.

[2] There can be no doubt but what this species occurs in Alaska and the northeastern part of Asia, from an examination of specimens in the U. S. National Museum collection from both regions.

* *Anodonta cognata* GOULD, U. S. Expl. Exp., XII, 1852, p. 435, figs. 546, 546*a*, 546*b*; Otia Conch., 1862, p. 187.—* CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 263.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 502.—* PÆTEL, Conch. Sam., III, 1890, p. 178.

Washington; Oregon; North California; East to Great Salt Lake.

ANODONTA CALIFORNIENSIS Lea.

* *Anodonta californiensis* LEA, Tr. Am. Phil. Soc., X, 1852, p. 286, pl. XXV, fig. 47; * Obs., V, 1852, p. 42, pl. XXV, fig. 47.—* CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 263.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* MUSGRAVE, Phot. Conch., 1863, pl. I, fig. 4.—* CLESSIN, Conch. Cab. Ano., 1874, p. 120, pl. XXXIX, figs. 4, 5.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 177.

* *Margaron* (*Anodonta*) *californiensis* LEA, Syn., 1852, p. 47; 1870, p. 75.

* *Anodon californiensis* SOWERBY, Conch. Icon., XVII, 1870, pl. XXVIII, fig. 113.

Washington, south to California; east to Idaho and Arizona. Probably a variety of the next.

† ANODONTA NUTTALLIANA Lea.

* *Anodonta nuttalliana* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 77, pl. XX, fig. 62; * Obs., II, 1838, p. 77, pl. XX, fig. 62.—* TROSCHEL, Arch. für Nat., V, 1839, Pt. 2, p. 238.—* HANLEY, Test. Moll., 1842, p. 216; * Biv. Shells, 1843, p. 216.—* CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 264.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* CLESSIN, Conch. Cab. Ano., 1874, p. 147, pl. L, figs. 1, 2.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 190, p. 182.

* *Margarita* (*Anodonta*) *nuttalliana* LEA, Syn., 1838, p. 29.

* *Margaron* (*Anodonta*) *nuttalliana* LEA, Syn., 1852, p. 47; 1870, p. 75.

* *Anodon nuttalliana* CATLOW and REEVE, Conch. Nom., 1845, p. 67.—* GOULD and CARPENTER, Pr. Zool. Soc. Lond., 1856, p. 218.

* *Anodonta triangularis* TRASK, Pr. Ac. Nat. Sci. Phila., I, 1855, p. 29.

* *Anodon triangularis*, SOWERBY, Conch. Icon., XVII, 1870, pl. XXIX, fig. 56*b*.

Washington to California.

† ANODONTA WAHLAMETENSIS Lea.

* *Anodonta wahlametensis* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 78, pl. XX, fig. 64; * Obs., II, 1838, p. 78, pl. XX, fig. 64.—* TROSCHEL, Arch. für Nat., V, 1839, Pt, 2, p. 238.—* HANLEY, Test. Moll., 1842, p. 215; Biv. Shells, 1843, p. 215, pl. XXIV, fig. 13.—* CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 264.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* CLESSIN, Conch. Cab. Ano., 1874, p. 161, pl. LIII, figs. 7, 8.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 186.

* *Margarita* (*Anodonta*) *wahlametensis* LEA, Syn., 1838, p. 29.

* *Anodon wahlametensis* CATLOW and REEVE, Conch. Nom., 1845, p. 68.—* GOULD and CARPENTER, Pr. Zool. Soc. Lond., 1856, p. 218.—* SOWERBY, Conch. Icon., XVII, 1867, pl. IX, fig. 22.

* *Margaron* (*Anodonta*) *wahlametensis* LEA, Syn., 1852, p. 47; 1870, p. 75.

* *Anodonta rotundata* TRASK, Pr. Cal. Ac. Sci., I, 1855, p. 29.

* *Anodon rostratus* SOWERBY, Conch. Icon., XVII, 1867, pl. II, fig. 4.

* *Anodonta laosensis* FISCHER,[1] Bull. Soc. H. N. Autun., 1891, p. 219.

Washington; south to southern California; east to Utah.

[1] Sowerby states that his species is from Lao, (Laos?) an error without doubt, as it is certainly *A. wahlametensis*. As the name *rostrata* had been used for an *Anodonta* by Kokeil (or Rossmassler) Fischer changed Sowerby's name to *laosensis*.

ANODONTA COARCTATA Anton.

**Anodonta coarctata* ANTON, Verz. der Conch., 1839, p. 16.—*TROSCHEL, Arch. für Nat., XI, 1845, Pt. 2, p. 323.—*KUSTER, Conch. Cab. Ano., 1853, p. 34, pl. VIII, fig. 2.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 177.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 519.

**Anodonta chapalensis* CROSSE and FISCHER, J. de Conch., XL, 1892, p. 295.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 518, pl. LXIV, figs. 8–11.

Lake Chapala, State of Jalisco, Mexico.

†ANODONTA EXILIOR Lea.

**Anodonta exilior* LEA, Pr. Ac. N. Sci. Phila., I, 1871, p. 188; *Jl. Ac. N. Sci. Phila., VIII, 1874, p. 24, pl. VII, fig. 21; *Obs., XIII, p. 28, pl. VII, fig. 21.—* B. H. WRIGHT, Check List, 1888.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 520.

**Anodonta chalcoensis* CROSSE and FISCHER, Jl. de Conch., XLI, 1893, p. 110.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 522, pl. LXIV, figs. 7, 7*a*.

Mexico, mostly in the Pacific drainage.

(Group of *Anodonta dejecta*.)

Shell rather solid, subtrapezoidal, narrower and rounded in front, where it is often considerably thickened, with a slight post-dorsal wing; beaks rather compressed, the sculpture consisting of numerous irregular ridges which have a tendency to become doubly looped and nodulous; epidermis rather smooth and shining, greenish or ashy brown; nacre lurid, darker in the cavity of the beaks; muscle scars irregular, not well defined; dorsal scars few and rather deep.

Animal with dark colored branchiæ, the inner wider in front, nearly or quite free from the abdominal sac, the outer wrinkled on the outside into longitudinal and vertical folds, all four united to the mantle to the extreme posterior end; palpi very large; mantle with a wide, thickened double edge; branchial opening with numerous papillæ; anal opening smooth; superanal opening long, deep, united a long way below.

†ANODONTA DEJECTA Lewis.

**Anodonta dejecta* LEWIS, Field and Forest, I (August and September), 1875, p. 26;[1] *Yarrow's Report, 1875, p. 952.—* B. H. WRIGHT, Check List, 1888.—SIMPSON, Pr. U. S. Nat. Mus., XIX, 1896, p. 372, pl. XXXII, figs. 4, 5.

*† *Anodonta mearnsiana* SIMPSON, Nautilus, VI, 1893, p. 134.

Arizona; southeastern California; northwest Mexico.

(Group of *Anodonta cataracta*.)

Shell thin or solid, inflated, rather evenly rounded in front, generally somewhat biangulate behind, and very slightly winged in the post-

[1] Said to be from Arkansas River or its tributaries west of the one hundredth meridian and collected by Dr. H. C. Yarrow, surgeon and naturalist of Wheeler's expedition. This locality is erroneous, as it belongs, no doubt, exclusively to the Pacific drainage.

dorsal region; beaks rather full, the sculpture consisting of a moderate number of concentric ridges or corrugations, which are generally somewhat doubly looped, and often slightly nodulous; epidermis bright and shining, sometimes faintly rayed.

Animal with large branchiæ, the inner larger in front, free in part from the abdominal sac; marsupium occupying the entire outer gills, forming an enormously thick, liver-colored pad when filled; mantle thin, thickened on its edge; branchial papillæ small; anal opening smooth.

† ANODONTA CATARACTA Say.[1]

Anodonta cataracta SAY, Nich. Enc., 1st ed., II, 1816, pl. III, fig. 4.—* CONRAD, New L. and F. W. Shells, 1834, p. 73.—* FERUSSAC, Guer. Mag., 1835, p. 25.—* DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 566; 3d ed., II, 1839, p. 678; Tr. Elem., I, 1853, Pt. 2, p. 218, pl. XXX, fig. 4.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 263.—* KUSTER, Conch. Cab. Ano., 1853, p. 33, pl. VII, fig. 2.—* PÆTEL, Conch. Sam., III, 1890, p. 177.—* H. CARPENTER, Nautilus, IV, 1890, p. 56.

* *Unio cataracta* DESHAYES, Tr. Elem. Conch., 1839, p. 18, pl. XXX, fig. 1.

* *Anodon cataracta* CATLOW and REEVE, Conch. Nom., 1845, p. 66.

* *Mytilus cataractus* EATON, Zool. Text-Book, 1826, p. 224.

* *Anodon cataractus* SOWERBY, Conch. Man., 1839, fig. 152; Conch. Icon., XVII, 1867, pl. IX, fig. 25.

* ? *Mytilus fluviatilis* DILLWYN, Cat., I, 1817, p. 316.—* HANLEY, Ind. Test. Rev., 1856, p. 69.

* *Anodonta fluviatilis* BOSC, Hist. Nat. Coq., 1824, III, p. 143.—* HANLEY, Test. Moll., 1842, p. 217.—* C. B. ADAMS, Thompson's Hist. of Vt., 1842, p. 164; * F. W. and L. S. of Vt., 1842, p. 14.—* HANLEY, Biv. Shells, 1843, p. 217.—* STIMPSON, Shells of N. Eng., 1851, p. 15.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 502.—* LATCHFORD, Tr. Ot. F. N. Club, 1882, p. 56.—* B. H. WRIGHT, Check List, 1888.

* *Margarita* (*Anodonta*) *fluviatilis* LEA, Syn., 1836, p. 51; 1838, p. 30.

* *Anodon fluviatilis* GOULD, Inv. Mass., 1841, p. 117, fig. 80.—* DE KAY, Zool. of N. Y., Pt. 5, 1843, p. 203, pl. XVIII, fig. 234.—* CATLOW and REEVE, Conch. Nom., 1845, p. 66.—* HARTMAN and MICHENER, Conch. Cest, 1874, p. 94, fig. 192.—SOWERBY, Conch. Icon., XVII, 1869, pl. XXII, fig. 86.—* BINNEY, Inv. of Mass., 2d ed., 1870, p. 178, fig. 480.

* *Margaron* (*Anodonta*) *fluviatilis* LEA, Syn., 1852, p. 50; 1870, p. 80.

* *Mytilus marginatus* EATON, Zool. Text-Book, 1826, p. 224.

* *Anodonta dignota* FERUSSAC, Guer. Mag., 1835, p. 25.

* † *Anodonta virgulata* LEA,[2] Pr. Ac. N. Sci. Phila., I, 1857, p. 86; Jl. Ac. N. Sci. Phila., V, 1862, p. 213, pl. XXXII, fig. 282; * Obs., IX, 1863, p. 35, pl. XXXIII, fig. 282.—* CLESSIN, Conch. Cab. Ano., 1874, p. 152, pl. XLIX, figs. 1, 2.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 186.

* *Margaron* (*Anodonta*) *virgulata* LEA, Syn., 1870, p. 80.

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[1] This species is probably better known by Dillwyn's name, *fluviatilis*. According to Lea and Binney, the first edition of Nicholson's Encyclopedia appeared in 1816, which would give Say's name priority by one year. This edition is extremely rare, and I have never seen it. It is claimed by some authors to have been issued in 1817. Dillwyn refers his species to Gmelin, who states that his shell came from the fresh waters of Europe, and is allied to *anatina*, and it is quite likely it is *A. cygnea*. As there can be no doubt about Say's species, I think it best to use his name.

[2] I think this is merely a southern form of *cataracta* and scarcely worthy of a varietal name.

* † *Anodonta williamsii* LEA, Pr. Ac. N. Sci. Phila., VI, 1862, p. 169; * Jl. Ac. N. Sci. Phila., VI, 1866, p. 27, pl. x, fig. 26; * Obs., XI, 1867, p. 31, pl. x, fig. 26.—* CLESSIN, Conch. Cab. Ano., 1874, p. 154, pl. li, figs. 1, 2.—* B. H. WRIGHT, Check List, 1888.—* SOWERBY, Conch. Icon., XVII, 1870, pl. xxviii, fig. 112.

* *Margaron* (*Anodonta*) *williamsii* LEA, Syn., 1870, p. 81.

* † *Anodonta tryonii* LEA, Pr. Ac. N. Sci. Phila., VI, 1862, p. 169; * Jl. Ac. N. Sci. Phila., VI, 1866, p. 28, pl. x, fig. 27; * Obs., XI, 1867, p. 32, pl. x, fig. 27.—* CLESSIN, Conch. Cab. Ano., 1874, p. 155, pl. li, figs. 3, 4.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 186.

* *Margaron* (*Anodonta*) *tryonii* LEA, Syn., 1870, p. 80.

* *Anodon tryonii* HARTMAN and MICHENER, Conch. Cest., 1874, p. 95, fig. 195.

Lower St. Lawrence drainage; streams draining into the Atlantic south to North Carolina. This species has been cited from Grand River, Michigan, and from north of Lake Superior. Mr. Bryant Walker states that the former locality is erroneous, and I presume that the latter is.

† ANODONTA MARGINATA Say.[1]

Anodonta marginata SAY, Nich. Encyc., II, 1816, pl. iii, fig. 5.—* C. B. ADAMS, Thompson's Hist. Vt., 1842, p. 14.—* STIMPSON, Shells of N. Eng., 1851, p. 15.

* *Anodonta marginatus* HANLEY, Biv. Shells, 1843, p. 217.

* *Anodonta fragilis* LAMARCK, An. sans. Vert., VI, 1819, p. 85.—* FERUSSAC, Guer. Mag., 1835, p. 25.—* DESHAYES, An. sans. Vert., 2d ed., VI, 1835, p. 566; 3d ed., II, 1839, p. 678.—* DELESSERT, Rec. Coq. Lam., 1841, pl. xiii, fig. 2, 1*c*, 2*a*, 2*b*.—* HANLEY, Test. Moll., 1842, p. 217; * Biv. Shells, 1843, p. 217.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 264.—* CLESSIN, Conch. Cab. Ano., 1854, p. 73, pl. xvii, figs. 3, 4.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 502.—* CHENU, Ill. Conch., 1858, pl. iii, figs. 4, 4*a*.—* LATCHFORD, Tr. Ottawa F. N. Club, 1882, p. 56.—B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 179.

* *Margarita* (*Anodonta*) *fragilis* LEA, Syn., 1836, p. 50; 1838, p. 30.

* *Anodon fragilis* CATLOW and REEVE, Conch. Nom., 1845, p. 67.—* SOWERBY, Conch. Icon., XVII, 1867, pl. xvii, fig. 61.

* *Margaron* (*Anodonta*) *fragilis* LEA, Syn., 1852, p. 49; 1870, p. 78.

* † *Anodonta lacustris* LEA, Pr. Ac. N. Sci. Phila., I, 1857, p. 84; * Jl. Ac. N. Sci. Phila., 1860, p. 363, pl. lxii, fig. 188; * Obs., VIII, 1860, p. 45, pl. lxii, fig. 188.—* CLESSIN, Conch. Cab. Ano., 1873, p. 110, pl. xxxiii, figs. 5, 6.—* LATCHFORD, Tr. Ottawa F. N. Club, 1882, p. 56.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 181.

* *Anodon lacustris* SOWERBY, Conch. Icon., XVII, 1867, pl. xix, fig. 73.

* *Margaron* (*Anodonta*) *lacustris*, LEA, Syn., 1870, p. 80.

* *Anodon flava* ANTHONY, Am. Jl. Conch., I, 1865, p. 160, pl. xiv, fig. 3.

* *Anodon flava* B. H. WRIGHT, Check List, 1888.

* *Anodon pallida* ANTHONY, Am. Jl. Conch., I, 1865, p. 162, pl. xv, fig. 3.

* *Anodonta pallida*, B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 153.

* *Anodon pallidus* SOWERBY, Conch. Icon., XVII, 1867, pl. xi, fig. 29.

* *Anodonta glandulosa* ANTHONY, Am. Jl. Conch., I, 1865, p. 163, pl. xvi, fig. 3.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 180.

[1] I am very sure that this = the *A. fragilis* Lamarck, and not the *fluviatilis* Dillwyn, as Dr. Lea believes. Say describes it as very thin and fragile; epidermis green olive, paler on the disk, and greener before (behind), within bluish white, edged with whitish, and from his dimensions and figure it is a smaller shell than Dillwyn's, the whole agreeing better with the *fragilis* of Lamarck.

**Anodon irisans* ANTHONY, Am. Jl. Conch., I, 1865, p. 163, pl. XVI, fig. 2.
**Anodonta irisans* B. H. WRIGHT, Check List, 1888.
**Anodonta irisans* PÆTEL, Conch. Sam., III, 1890, p. 180.
* ? *Anodon hordeum* SOWERBY, Conch. Icon., XVII, 1867, pl. XVIII, fig. 66.
* † *Anodonta subcarinata* CURRIER, Am. Jl. Conch., III, 1867, p. 113, pl. VI, fig. 5.—* B. H. WRIGHT, Check List, 1888.[1]
* ? *Anodon subcylindracea* SOWERBY, Conch. Icon., XVII, 1867, pl. XV, fig. 47*a*.
**Anodon exilis* SOWERBY, Conch. Icon., XVII, 1869, pl. XXII, fig. 84.
* ? *Anodon pholadiformis* SOWERBY, Conch. Icon., XVII, 1870, pl. XXVII, fig. 106.

St. Lawrence River drainage.

ANODONTA TERES Conrad.

**Anodonta teres* CONRAD, New F.W. Shells, 1834, p. 47, pl. VII, fig. 2.[2]—* FERUSSAC Guerin. Mag., 1835, p. 25.—* MÖLLER, Syn. Nov. Gen., 1836, p. 194.—* CHENU, Bib. Conch., 1st ser., III, 1845, p. 25, pl. II, fig. 9.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 264.

Santee Canal, South Carolina.

† ANODONTA IMPLICATA Say.

Anodonta implicata SAY, New Harm. Diss., II, No. 22, 1829, p. 340.—* CONRAD, New F. W. Shells, 1834, p. 73.—FERUSSAC, Guerin. Mag., 1835, p. 250.—* SAY, New L. and F. W. Shells, 1840, p. 10.—* L. W. SAY, Terr. and Fluv. Shells, 1840, p. 11.—STIMPSON, Shells of N. Eng., 1851, p. 15.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 264.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 502.—* CLESSIN, Conch. Cab. Ano., 1873, p. 78, pl. XIX, fig. 3.—* LATCHFORD, Tr. Ottawa F. N. Club, 1882, p. 56.—* B. H. WRIGHT, Check List, 1888.—* H. CARPENTER, Nautilus, IV, 1890, p. 57.
**Anodon implicata* GOULD, Inv. Mass., 1841, p. 118, fig. 78; 2d ed., 1870, p. 180, fig. 481.—* DE KAY, Zool. of N. Y., Pt. 5, 1843, p. 202.—* HARTMAN and MICHENER, Conch. Cest., 1874, p. 94, fig. 193.
**Margaron* (*Anodonta*) *implicata* LEA, Syn., 1852, p. 50; 1870, p. 80.
* ? *Anodon implicatus* SOWERBY, Conch. Icon., XVII, 1867, pl. XIII, fig. 44.[3]
* † *Anodonta newtonensis* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 79, pl. XXI, fig 66; * Obs., II, 1838, p. 79, pl. XXI, fig. 66.—* HANLEY, Test. Moll., 1842, p. 219.
* *Margarita* (*Anodonta*) *newtonensis* LEA, Syn., 1838, p. 30.
* *Anodon newtonensis* SOWERBY, Conch. Icon., XVII, 1867, pl. XVII, fig. 62.
* *Anodonta newtoniensis* TROSCHEL, Arch. für. Naturg., V, 1839, p. 239.—* PÆTEL, Conch. Sam., III, 1890, p. 182.
* *Anodon newtoniana* CATLOW and REEVE, Conch. Nom., 1845, p. 67.
* ? *Anodon excurvata* DE KAY,[4] Zool. of N. Y., Moll., Pt. 5, 1843, p. 202, pl. XVII, fig. 233.—CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 264.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 179.

[1] The type of this is in Mr. Bryant Walker's collection, and seems to be a variety of *marginata*.

[2] It is hard to say where this belongs, or what it is. The figure shows it a dirty yellowish, without rays, and shaped something like *A. fragilis*, while the description is too brief to properly characterize it.

[3] This may be *A. grandis* Say.

[4] I am not certain whether this is the *implicata* of Say or his *cataracta*. De Kay states that the shell is thin and fragile, and the figure shows it to be brown, green, and yellowish, in irregular bands, and apparently shining and smooth like *cataracta*. He says that it is nearest to *implicata*.

**Anodonta housatonica* LINSLEY, Am. Jl. Sci., 1845, p. 277.—* STIMPSON, Shells of N. Eng., 1851, p. 15.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 502.—* PÆTEL, Conch. Sam., III, 1890, p. 180.

St. Lawrence drainage; north to Lake Winnipeg; south in streams flowing into the Atlantic to Virginia; not reported from Michigan.

† ANODONTA HALLENBECKII Lea.

**Anodonta hallenbeckii* LEA, Pr. Ac. N. Sci. Phila., II, 1858, p. 139; * Jl. Ac. N. Sci. Phila., IV, 1859, p. 232, pl. XXXII, fig. 112; * Obs., VII, 1859, p. 50, pl. XXXII, fig. 112.—* CLESSIN, Conch. Cab. Ano., 1873, p. 95, pl. XXVIII, figs. 3, 4.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 180.—* SOWERBY, Conch. Icon., XVII, 1869, pl. XXIII, fig. 89, 483.

**Margaron* (*Anodonta*) *hallenbeckii* LEA, Syn., 1870, p. 78.

* † *Anodonta gesnerii* LEA, Pr. Ac. N. Sci. Phila., X, 1858, p. 139; * Jl. Ac. N. Sci. Phila., IV, 1859, p. 231, pl. XXXI, fig. 109.—* Obs., VII, 1859, p. 49, pl. XXXI, fig. 109.—* CLESSIN, Conch. Cab. Ano., 1873, p. 95, pl. XXVIII, figs. 1, 2.—* B. H. WRIGHT, Check List, 1888.

**Anodon gesnerii* SOWERBY, Conch. Icon., XVII, 1867, pl. VII, fig. 15.

**Margaron* (*Anodonta*) *gesnerii* LEA, Syn., 1870, p. 78.

**Anodonta gessneri* PÆTEL, Conch. Sam., III, 1890, p. 179.[1]

Georgia.

† ANODONTA DOLIARIS Lea.[2]

**Anodonta dolearis* LEA, Pr. Ac. N. Sci. Phila., VII, 1863, p. 193.

**Anodonta doliaris* LEA, Jl. Ac. N. Sci. Phila., VI, 1866, p. 24, pl. VIII, fig. 23; * Obs., XI, 1867, p. 28, pl. VIII, fig. 23.—* CLESSIN, Conch. Cab. Ano., 1874, p. 130, pl. XLII, figs. 1, 2.—* B. H. WRIGHT, Check List, 1888.

**Margaron* (*Anodonta*) *doliaris* LEA, Syn., 1870, p. 81.

North Carolina.

† ANODONTA DARIENSIS Lea.

**Anodonta dariensis* LEA, Pr. Ac. N. Sci. Phila., II, 1858, p. 139; * Jl. Ac. N. Sci. Phila., IV, 1859, p. 230, pl. XXVIII, fig. 99; * Obs., VII, 1859, p. 48, pl. XXVIII, fig. 99.—* CLESSIN, Conch. Cab. Ano., 1874, p. 118, pl. XXXVII, figs. 3, 4.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 178.

**Anodon dariensis* SOWERBY, Conch. Icon., XVII, 1867, pl. XVIII, fig. 70.

**Margaron* (*Anodonta*) *dariensis* LEA, Syn., 1870, p. 80.

Georgia; north Florida.

Group of *Anodonta imbecillis*.

Shell thin, elliptical, sometimes slightly produced near the center of the base, pointed behind, with a slight posterior dorsal wing; area of the beaks generally flattened though often full; beak sculpture consisting of several rather delicate, irregular ridges which show a tendency to break into nodules; epidermis bright and smooth, usually marked

[1] The type of *A. hallenbeckii* is a sulcate shell, somewhat constricted at the central base, while that of *A. gesneri* is not constricted and is smoother. The former may be slightly diseased, and the museum series of shells appears to absolutely connect the two.

[2] First spelled *dolearis* by Lea, and afterwards changed by him to *doliaris*.

with beautiful, delicate, capillary rays; nacre bluish. Animal sometimes highly colored; gills nearly alike in size, often having a distinct border of different texture; eye-spots on branchial opening generally perceptible.

†ANODONTA IMBECILLIS Say.

Anodonta imbecillis SAY, N. Harm. Diss., II, No. 23, 1829, p. 355.—* CONRAD, New F. W. Shells, 1834, p. 73.—* FERUSSAC, Guer. Mag., 1835, p. 25.—* L. SAY, Terr. and Fluv. Shells, 1840, p. 13.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 264.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 502.—* CALKINS, Pr. Dav. Ac. Sci., 1874, p. 47.—* CLESSIN, Conch. Cab. Ano., 1874, p. 70, pl. XLIX, figs. 4, 5; XXV, fig. 4.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 180.—* STEARNS, Pr. U. S. Nat. Mus., XIV, 1891, p. 106.—* BAKER, Moll. Chicago, Pt. 1, 1898, p. 55, pl. V, fig. 1.

* *Margaron* (*Anodonta*) *imbecillis* LEA, Syn., 1852, p. 50; 1870, p. 80.

* *Anodon imbecillis* SOWERBY, Conch. Icon., XVII, 1870, pl. XXVII, fig. 102.

* † *Anodonta incerta* LEA, Tr. Am. Phil. Soc., V, 1834, p. 46, pl. VI, fig. 16; * Obs., I, 1834, p. 158, pl. VI, fig. 16.—* FERUSSAC, Guer. Mag., 1835, p. 25.—* HANLEY, Test. Moll., 1842, p. 218.—* P.ETEL, Conch. Sam., III, 1890, p. 180.

* *Margarita* (*Anodonta*) *incerta* LEA, Syn., 1836, p. 51; 1838, p. 30.

* *Anodon incerta* CATLOW and REEVE, Conch. Nom., 1845, p. 67.

* *Anodon incertus* SOWERBY, Conch. Icon., XVII, 1867, pl. XVII, fig. 59.

* *Anodon horda* GOULD, Pr. Bost. Soc. N. H., V, 1855, p. 229; * Otia Conch., 1862, p. 218.

* *Anodonta hordeum* P.ETEL, Conch. Sam., III, 1890, p. 180.

Entire Mississippi drainage area; south Michigan; North Carolina to Georgia; southwest to Matamoras, Mexico.

†ANODONTA HENRYANA Lea.[1]

* *Anodonta henryana* LEA, Pr. Ac. N. Sci. Phila., I, 1857, p. 102; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 373, pl. LXVI, fig. 198; * Obs., VIII, 1860, p. 55, pl. LXVI, fig. 198.—* CLESSIN, Conch. Cab. Ano., 1874, p. 141, pl. XLV, figs. 5, 6.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 180.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 525.

* *Margaron* (*Anodonta*) *henryana* LEA, Syn., 1870, p. 81.

* *Anodon henryana* SOWERBY, Conch. Icon., XVII, 1870, pl. XXXIV, fig. 140.[2]

Northeast Mexico; southern Texas.

†ANODONTA GIBBOSA Say.[3]

Anodonta gibbosa SAY, Exp. to St. Peters R., 1824, p. 265, pl. XIV, figs. 3, 4.—* FERUSSAC, Guer. Mag., 1835, p. 25; * CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 264.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 502.—* CLESSIN, Conch. Cab. Ano., 1873, p. 74, pl. XVIII, fig. 3.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 179.

[1] Typically very distinct from *imbecillis*, having the dorsal and basal lines quite straight. But there are many intermediate forms which are very hard to place, and it is probably only a variety of the latter.

[2] *Anodonta impura* Say, (Disseminator, 1829, p. 355) from Mexico has never been figured and was only briefly described. It is quite likely that it is the same as *A. henryana*.

[3] An exceedingly variable species in form, size, and solidity. *A. dunlapiana* seems to me to be only a slightly elongated, rather solid form.

**Margarita* (*Anodonta*) *gibbosa* LEA, Syn., 1838, p. 31.
**Anodon gibbosa* CATLOW and REEVE, Conch. Nom., 1845, p. 67.
**Margaron* (*Anodonta*) *gibbosa* LEA, Syn., 1852, p. 51; 1870, p. 81.
**Anodon gibbosus* SOWERBY, Conch. Icon., XVII, 1867, pl. IX, fig. 23.
*†*Anodonta cowperiana* LEA, Pr. Am. Phil. Soc., I, 1840, p. 289.
**Anodonta couperiana* LEA, Tr. Am. Phil. Soc., VIII, 1842, p. 227, pl. XX, fig. 146; * Obs., III, 1842, p. 65, pl. XX, fig. 46.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 263.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 502.—* CLESSIN, Conch. Cab. Ano., 1874, p. 148, pl. L, figs. 3, 4.—* B. H. WRIGHT, Check List, 1888.—* SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 433, pl. LXXIV, fig. 1.
**Margaron* (*Anodonta*) *couperiana* LEA, Syn., 1852, p. 51; 1870, p. 81.
**Anodonta cooperiana* PÆTEL, Conch. Sam., III, 1890, p. 178.

† ANODONTA GIBBOSA var. DUNLAPIANA Lea.

*†*Anodonta dunlapiana* LEA, Pr. Am. Phil. Soc., II, 1842, p. 225; * Tr. Am. Phil. Soc., VIII, 1842, p. 248, pl. XXVII, fig. 65; * Obs., III, 1842, p. 86, pl. XXVII, fig. 65.—* SOWERBY, Conch. Icon., XVII, 1869, pl. XXIII, fig. 87.—* CLESSIN, Conch. Cab. Ano., 1876, p. 220, pl. LXXIV, figs. 1, 2.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 179.

South Carolina to Florida.

(Group of *Anodonta suborbiculata*.)

Shell large, compressed, suborbicular, somewhat produced near the center of the base, rounded in front and bluntly pointed behind, with a slight posterior dorsal wing; beaks flattened, the sculpture consisting of a few irregular ridges, which are generally broken into nodules, sometimes only corrugated; a well-defined but low posterior ridge separates the smooth, shining area in front from a darker and rougher one behind; epidermis with numerous delicate, capillary rays near the beaks; muscle scars very large; nacre rather coppery and iridescent; palleal line broken, often marked with radiating ridges. Animal unknown.[1]

† ANODONTA SUBORBICULATA Say.

Anodonta suborbiculata SAY, New Harm. Disseminator (newspaper form), January 29, 1831; Am. Conch. I, No. II, 1831. pl. XI.—* CONRAD, New F. W. Shells, 1834, p. 73.—* FERUSSAC, Guer. Mag., 1835, p. 25.—* HANLEY, Test. Moll., 1842, p. 222; Biv. Shells, 1843, p. 222.—* CHENU, Bib. Conch., 1st ser., III, 1845, p. 18, pl. III, figs. 1, 1a.—* CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 264.—* H. and A. ADAMS, Gen. Rec. Moll, II, 1857, p. 503.—* CLESSIN, Conch. Cab. Ano., 1874, p. 160, pl. LII, figs. 1, 2.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 185.
**Margarita* (*Anodonta*) *suborbiculata* SAY, Syn., 1836, p. 52; 1838, p. 31.
**Anodon suborbiculata* CATLOW and REEVE, Conch. Nom., 1845, p. 68.
**Margaron* (*Anodonta*) *suborbiculata* SAY, Syn., 1852, p. 51; 1870, p. 81.
***Anodon suborbiculatus* SOWERBY, Conch. Icon., XVII, 1867, pl. V, fig. 11.

Nebraska, Iowa; Illinois; south to Louisiana. Abundant locally.

[1] Closely related to the *imbecillis* group, but differing in form, beak sculpture, the large muscle scars, and the palleal line.

(Group of *Anodonta woodiana*.)[1]

Shell oval, inflated, sometimes narrowed in front, pointed behind, and often a little produced at the posterior base, slightly winged in the post-dorsal region; beaks full, sculptured with numerous strong concentric ridges, which are either straight in the center of the disk or slightly doubly looped. There is often a faint posterior ridge, which may be double, making the shell feebly biangulate behind; dorsal scars one or two under the beaks; muscle scars irregular.

Animal with the gills large, equal in size, rounded below, free the greater part of their length from the abdominal sac, somewhat wrinkled; marsupium occupying the entire outer gills, forming thick brown pads when filled; palpi large, subelliptical, free from the mantle a long way; mantle having a wide, thickened edge; branchial opening crowded with dark papillæ; anal opening with no papillæ, but having purple ridges inside; superanal opening closed nearly its whole length.[2]

†ANODONTA WOODIANA Lea.

**Symphynota woodiana* LEA, Tr. Am. Phil. Soc., V, 1834, p. 42, pl. v, fig. 13; *Obs., I, 1834, p. 154, pl. v, fig. 13.

**Margarita* (*Anodonta*) *woodiana* LEA, Syn., 1836, p. 48; 1838, p. 29.

**Anodon woodiana* CATLOW and REEVE, Conch. Nom., 1845, p. 68.—*SOWERBY, Conch. Icon., XVII, 1870, pl. XXXVI, fig. 149.

**Anodonta woodiana* HANLEY, Test. Moll., 1842, p. 215; *Biv. Shells, 1843, p. 215.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—*CLESSIN, Conch. Cab. Ano., 1875, p. 146, pl. XLVIII, figs. 1, 2.

**Margaron* (*Anodonta*) *woodiana* LEA, Syn., 1852, p. 47; 1870, p. 75.

†*Symphynota magnifica* LEA,[3] Tr. Am. Phil. Soc., V, 1834, p. 42, pl. v, fig. 14; Obs., I, 1834, p. 155, pl. v, fig 14.

**Margarita* (*Anodonta*) *magnifica* LEA, Syn., 1836, p. 48; 1838, p. 29.

**Anodonta magnifica* HANLEY, Test. Moll., 1842, p. 215; Biv. Shells, 1843, p. 215.—*H. and A. ADAMS, Gen. Rec. Moll, II, 1857, p. 503.—*CHENU, Man., 1859, II, p. 146, fig. 719.—*SCHRENCK, Reis and F. Am. Lande., II, 1867, p. 718, pl. XXVIII, figs. 1, 2.—*PÆTEL, Conch. Sam., III, 1890, p. 181.

**Anodon magnifica* CATLOW and REEVE, Conch. Nom., 1845, p. 67.—SOWERBY, Conch. Icon., XVII, 1870, pl. XXV, fig. 96.

**Margaron* (*Anodonta*) *magnifica* LEA, Syn., 1852, p. 47; 1870, p. 75.

*†*Anodonta aurata* KUSTER, Conch. Cab. Ano., 1853, p. 30, pl. VI, fig. 2.

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[1] Fischer has made a subgenus *Pteranodon* (Man. Conch., p. 1003) for *A. magnifica*, but I do not see any need of giving it and the related species any higher rank than that of a group. The shell and animal differ but little from those of other Anodontas.

[2] A group closely agreeing in general characters, but having enormous individual variation. Père Heude has bestowed specific names on a great number of forms, most of which are, I think, merely mutations of Lea's *woodiana*. Fortunately the U. S. National Museum possesses in the Morelet collection a large series of author's specimens, and the excellent figures in the Conchyliologie Fluviatile Nanking enable me to straighten out this difficult group to some extent.

[3] Larger and rather more finely developed than *A. woodiana*, but the large series of material I have examined absolutely connects the two.

* ? *Anodon rotundatus* SWAINSON, Ex. Conch., 2d ed., 1841, pl. XXXVII.
* *Anodon gibbum* BENSON, Jl. Asiat. Soc., XXIV, 1855, p. 135.
* *Anodon gibba* SOWERBY, Conch. Icon., XVII, 1867, pl. VI, fig. 13.—HEUDE, Conch. Fl. Nank., VII, 1881, pl. LI, fig. 95.
* *Margaron* (*Anodonta*) *gibba* LEA, Syn., 1870, p. 81.—* VON MARTENS, Nov. Conch., IV, 1876, p. 159, pl. CXXXVI, figs. 6, 7.
* *Anodonta gibba* CLESSIN, Conch. Cab. Ano., 1875, p. 181, pl. LX, fig. 4.—* PÆTEL, Conch. Sam., III, 1890, p. 179.
* *Anodon tricostatus* SOWERBY, Conch. Icon., XVII, 1870, pl. XXV, fig. 98.—* PÆTEL, Conch. Sam., III, 1890, p. 186.
* *Anodonta edulis* HEUDE, J. de Conch., XXII, 1874, p. 117.
* *Anodon edulis* HEUDE, Conch. F. Nank., I, 1875, pl. VIII, fig. 18.
* *Anodonta edulis* PÆTEL, Conch. Sam., III, 1890, p. 179.
* † *Anodon securiformis* HEUDE, Conch. F. Nank., III, 1877, pl. XVIII, fig. 39.
* *Anodonta securiformis* PÆTEL, Conch. Sam., III, 1890, p. 167.
* † *Anodon nigricans* HEUDE, Conch. F. Nank., III, 1877, pl. XIX, fig. 41.
* *Anodonta nigricans* PÆTEL, Conch. Sam., III, 1890, p. 182.
* † *Anodon piscatorum* HEUDE, Conch. F. Nank., IV, 1878, pl. XXVI, fig. 56.
* *Anodon elliptica* HEUDE, C. F. Nank., IV, 1878, pl. XXVII, fig. 58.
* † *Anodon fusca* HEUDE, C. F. Nank., IV, 1878, pl. XXVIII, fig. 59.
* *Anodon friniana* HEUDE, C. F. Nank., IV, 1878, pl. XXVIII, fig. 60.
* *Anodon joreti* HEUDE, C. F. Nank., IV, 1878, pl. XXIX, fig. 62.
* † *Anodon striata* HEUDE, C. F. Nank., IV, 1878, pl. XXX, fig. 63.
* *Anodonta striata* PÆTEL, Conch. Sam., III, 1890, p. 185.
* † *Anodon pacifica* HEUDE, C. F. Nank., IV, 1878, pl. XXXII, fig. 66.
* † *Anodon tumida* HEUDE, C. F. Nank., V, 1879, pl. XXXV, fig. 69.
* *Anodonta tumida* PÆTEL, Conch. Sam., III, 1890, p. 186.
* *Anodon subtetragona* HEUDE, C. F. Nank., V, 1879, pl. XXXVI, fig. 70.
* *Anodon lineata* HEUDE, C. F. Nank., V, 1879, pl. XXXVI, fig. 71.
* *Anodonta lineata* PÆTEL, Conch. Sam., III, 1890, p. 181.
* *Anodon irregularis* HEUDE, C. F. Nank., V, 1879, pl. XXXVII, fig. 73.
* *Anodonta irregularis* PÆTEL, Conch. Sam., III, 1890, p. 180.
* *Anodon melanochlorea* HEUDE, C. F. Nank., V, 1879, pl. XXXVIII, fig. 74.
* *Anodonta melanochlorea* PÆTEL, Conch. Sam., III, 1890, p. 182.
* † *Anodon agricolarum* HEUDE, C. F. Nank., V, 1879, pl. XXXIX, fig. 75.
* *Anodonta agricolarum* PÆTEL, Conch. Sam., III, 1890, p. 176.
* † *Anodon mingorum* HEUDE, C. F. Nank., V, 1879, pl. XL, fig. 77.
* *Anodonta mingorum* PÆTEL, C. Sam., III, 1890, p. 182.
* *Anodon bigibba* HEUDE, C. F. Nank., VI, 1880, pl. XLI, fig. 78.
* *Anodonta bigibba* PÆTEL, C. Sam., III, 1890, p. 177.
* *Anodon despecta* HEUDE, C. F. Nank., V, 1880, pl. XLI, fig. 79.
* *Anodon obtusa* HEUDE, C. F. Nank., VI, 1880, pl. XLII, fig. 80.
* *Anodon navicella* HEUDE, C. F. Nank., VI, 1880, pl. XLII, fig. 81.
* *Anodonta navicula* PÆTEL, C. Sam., III, 1890, p. 182.
* *Anodon orbicularis* HEUDE, C. F. Nank., VI, 1880, pl. XLII, fig. 82.
* *Anodonta orbicularis* PÆTEL, C. Sam., III, 1890, p. 182.
* *Anodon limosa* HEUDE, C. F. Nank., VI, 1880, pl. XLIII, fig. 83.
* *Anodonta limosa* PÆTEL, C. Sam., III, 1890, p. 181.
* *Anodon livida* HEUDE, C. F. Nank., VI, 1880, pl. XLIII, fig. 84.
* *Anodonta livida* PÆTEL, C. Sam., III, 1890, p. 181.
* *Anodon castanea* HEUDE, C. F. Nank., VI, 1880, pl. XLIII, fig. 85.
* *Anodonta castanea* PÆTEL, C. Sam., III, 1890, p. 177.
* *Anodon minuta* HEUDE, C. F. Nank., VI, 1880, pl. XLIV, fig. 86.
* *Anodonta minuta* PÆTEL, C. Sam., III, 1890, p. 182.
* † *Anodon succinea* HEUDE, C. F. Nank., VI, 1880, pl. XLIV, fig. 87.
* *Anodonta succinea* PÆTEL, C. Sam., III, 1890, p. 185.

* †*Anodon chiniana* HEUDE, C. F. Nank., VI, 1880, pl. XLV, fig. 88.
* *Anodonta chiniana* PÆTEL, C. Sam., III, 1890, p. 177.
* *Anodonta scaphydium* HEUDE, C. F. Nank., VI, 1880, pl. XLVI, fig. 89.
* *Anodonta scaphidium* PÆTEL, C. Sam., III, 1890, p. 184.
* †*Anodon puerorum* HEUDE, C. F. Nank., VII, 1880, pl. XLVII, fig. 90.
* *Anodonta puerorum* PÆTEL, C. Sam., III, 1890, p. 183.
* *Anodon indecora* HEUDE, C. F. Nank., VI, 1880, pl. XLVIII, fig. 91.
* *Anodonta indecora* PÆTEL, C. Sam., III, 1890, p. 180.
* *Anodon sorini* HEUDE, C. F. Nank., VII, 1881, pl. XLIX, fig. 92.
* *Anodonta sorini* PÆTEL, C. Sam., III, 1890, p 185.
* *Anodon rosea* HEUDE, C. F. Nank., VII, 1881, pl. L, fig. 93.
* *Anodonta rosea* PÆTEL, C. Sam., III, 1890, p. 184.
* *Anodon aubreyi* HEUDE, C. F. Nank., VII, 1881, pl. LII, fig. 97.
* *Anodonta aubreyi* PÆTEL, C. Sam.. III, 1890, p. 176.
* *Anodon confusa* HEUDE, C. F. Nank., VII, 1881, pl. LIII, fig. 99.
* *Anodonta confusa* PÆTEL, C. Sam., III, 1890, p. 178.
* *Anodon obtusata* HEUDE, C. F. Nank., VII, 1881, pl. LIV, fig. 100.
* *Anodon rubella* HEUDE, C. F. Nank., VII, 1881, pl. LIV, fig. 100 bis.
* *Andonta rubella* PÆTEL, C. Sam., III, 1890, p. 184.
* *Anodon pulchella* HEUDE, C. F. Nank., VII, 1881, pl. LV, fig. 101.
* *Anodonta pulchella* PÆTEL, C. Sam., III. 1890, p. 183.
* †*Anodon florida* HEUDE, C. F. Nank., VII, 1881, pl. LV, fig. 102.
* *Anodonta florida* PÆTEL, C. Sam., III, 1890, p. 179.
* *Anodonta retusa* HEUDE,[1] J. de Conch., XXXII, 1884, p. 20.—PÆTEL, Conch. Sam., III, 1890, p. 184.
* *Anodon intermerata* HEUDE, C. F. Nank., IX, 1885, pl. LXVII, fig. 130.
* *Anodonta intermerata* PÆTEL, C. Sam., III, 1890, p. 180.
* *Anodon filippiana* HEUDE, C. F. Nank., IX, 1885, pl. LXVIII, fig. 131.
* *Anodonta filippiana* PÆTEL, C. Sam., III, 1890, p. 183.
* *Anodon fantozatiana* HEUDE, C. F. Nank , IX, pl. LXIX, fig. 132.
* *Anodonta fantozatiana* PÆTEL, C. Sam., III, 1890, p. 179.

China; Cambodia; Siam; Amoor River?

† ANODONTA FENOUILII Heude.

* *Anodon fenouilii* HEUDE, C. F. Nank., IV, 1878, pl. XXXI, fig. 64.

China.

ANODONTA JOURDYI Morlet.

* *Anodonta jourdyi* MORLET, Jl. de Conch., XXXIV, 1886, pp. 76, 288, pl. XV, figs. 1, 1*a*.—* PÆTEL, C. Sam., III, 1890, p. 180.

Tonkin.

† ANODONTA LAUTA von Martens.

* *Anodonta lauta* VON MARTENS, S. B. Nat. Fr., 1877, p. 117; Abh. Senck. Nat. Ges., X, 1877, p. 152, fig. 1.—* KOBELT, Abh. Senck. Nat. Ges., XI, 1879, p. 434, pl. XXI, fig. 1; XXII, fig. 1 (var. *rostrata*).—* PÆTEL, C. Sam., III, 1890, p. 191.—* VON IHERING, Abh. Senck. Nat. Ges., XVIII, 1893, p. 150.
* *Anodonta woodiana* KOBELT,[2] Abh. Senck. Nat. Ges., XI, 1879, p. 433, pl. XX, fig. 1.—VON IHERING, Abh. Senck. Nat. Ges., XVIII, 1893, p. 151.

Japan.

[1] New name for *A. obtusa* preoccupied.
[2] This differs from *A. woodiana* of Lea, which I think has not been found in Japan. I think this is a form of *lauta*.

†ANODONTA JAPONICA von Martens.

**Anodonta japonica* VON MARTENS in Clessin, Conch. Cab. Ano., 1874, p. 144, pl. XLVII, figs. 3, 4.—* KOBELT, Abh. Senck. Nat. Ges., XI, 1879, p. 436, pl. XXII, fig. 3.—* PÆTEL, Conch. Sam., III, 1890, p. 180.—* VON IHERING, Abh. Senck. Nat. Ges., XVIII, 1893, p. 150, fig. 2.

**Anodonta cellensis* KOBELT, Abh. Senck. Nat. Ges., XI, 1879, p. 437, pl. XXII, fig. 4.

**Anodonta kobelti* VON IHERING, Abh. Senck. Nat. Ges.. XVIII, 1893, p. 152, fig. 1.

**Anondonta haconensis* VON IHERING, Abh. Senck. Nat. Ges., XVIII, 1893, p. 161, fig. 3.

Japan.

ANODONTA LUCIDA Heude

**Anodon lucida* HEUDE, C. F. Nank., III, 1877, pl. XX, fig. 43.

China.

†ANODONTA RIVULARIS Heude.

**Anodon rivularis* HEUDE, C. F. Nank., III, 1877, pl. XX, fig. 44.

**Anodonta rivularis* PÆTEL, C. Sam., III, 1890, p. 184.

China.

†ANODONTA HARLANDI Baird and Adams.

**Anodonta harlandi* BAIRD and ADAMS, Pr. Zool. Soc. Lond., 1867, p. 492, pl. XXVI, figs. 3, 3a.—* PÆTEL, C. Sam., III, 1890, p. 180.

**Anodon harlandi* HEUDE, C. F. Nank., IV, 1878, pl. XXV, fig. 55.

China.

ANODONTA GLOBOSULA Heude.

**Anodon globosula* HEUDE, C. F. Nank., IV, 1878, pl. XXV, fig. 54.

China.

†ANODONTA EUSCAPHYS Heude.

**Anodon euscaphys* HEUDE, C. F. Nank., V, 1879, pl. XXXV, fig. 68.

**Anodonta euscaphys* HEUDE, C. Sam., III, 1890, p. 179.

China.

ANODONTA FLUMINEA Heude.

**Anodon fluminea* HEUDE, C. F. Nank., III, 1877, pl. XX, fig 42.

**Anodon torrentis* HEUDE, C. F. Nank., IV, 1878, pl. XXIX, fig. 61.

**Anodonta fluminea* PÆTEL, C. Sam., III, 1890, p. 179.

China.

ANODONTA PUMILA Heude.

**Anodon pumila* HEUDE, C. F. Nank., V, 1879, pl. XXXVII, fig. 72.

**Anodonta pumila* PÆTEL, C. Sam., III, 1890, p. 183.

China.

ANODONTA DOLIOLUM Heude.

**Anodon doliolum* HEUDE, C. F. Nank. IV, 1878., pl. XXVII, fig. 57.

China.

ANODONTA CALIPYGOS Kobelt.

**Anodonta calipygos* KOBELT, Abh. Senck. Nat. Ges., XI, 1879, p. 435, pl. XIX, fig. 1.—* PÆTEL, C. Sam., III, 1890, p. 177.—* VON IHERING, Abh. Senck. Nat. Ges., XVIII, 1893, p. 150.

Japan.

ANODONTA UNDULIFERA Clessin.

**Anodonta undulifera* CLESSIN, Conch. Cab. Ano., 1876, p. 233, pl. LXXVI, figs. 1, 2.

China.

(Group of *Anodonta arcæformis.*)

Shell elliptical, with the dorsal and ventral lines parallel, greatly inflated, rounded in front, pointed and having a slight dorsal wing behind; umbonal region full, but the beaks flattened; the sculpture, consisting of numerous ridges, curved in front and nearly following the growth lines, then running backward in an almost straight line and ending at the low posterior ridge.

Animal unknown.

†ANODONTA ARCÆFORMIS Heude.

**Anodon arcæformis* HEUDE, C. F. Nank., III, 1877, pl. XIX, fig. 40.
**Anodonta arcæformis* PÆTEL, C. Sam., III, 1890, p. 176.

China.

(Group of *Anodonta grandis.*)

Shell oval, inflated, with a slight post-dorsal wing; umbonal region inflated; beak sculpture consisting of several coarse, irregular, often broken ridges, which are more or less doubly looped and generally nodulous, especially at the bases of the loops; epidermis usually rather smooth.

Animal with large gills, inner the larger, especially in front, free nearly or quite the entire length of the abdominal sac; palpi large and long; mantle much thickened at the border.

†ANODONTA GRANDIS Say.[1]

Anodonta grandis SAY, N. Harm. Diss., II, 1829, p. 341.—* CONRAD, New F. W. Shells, 1834, p. 73.—* FERUSSAC, Guer. Mag., 1835, p. 25.—* L. W. SAY, Terr. and Fluv. Shells, 1840, p. 12.—* HANLEY, Test. Moll., 1842, p. 220; * Biv. Shells, 1843, p. 220.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 264.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 502.—* CLESSIN, Conch. Cab. Ano., 1873, p. 96, pl. XXX, figs. 1, 2 —* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 180.—* BAKER, Moll. Chicago, Pt. 1, 1898, p. 51, pls. II, III, fig. 1; IV, fig. 1.

[1] A species having a very wide distribution and abundant in individuals. It is an exceedingly variable form, and a large number of names have been bestowed on its mutations, all of which seem to be closely connected. I have retained some of these in a varietal sense.

**Margarita* (*Anodonta*) *grandis* LEA, Syn., 1836, p. 52; 1838, p. 31.

**Anodon grandis* CATLOW and REEVE, Conch. Nom., 1845, p. 67.—* SOWERBY, Conch. Icon., XVII, 1870, pl. I, fig. 1.

**Margaron* (*Anodonta*) *grandis* LEA, Syn., 1852, p. 51; 1870, p. 81.

*† *Anodonta ovata* LEA,[1] Tr. Am. Phil. Soc., VI, 1838, p. 2, pl. II, fig. 2; Obs., II, 1838, p. 2, pl. II, fig. 2.—* TROSCHEL, Arch. für Nat., V, 1839; Pt. 2, p. 238.—* HANLEY, Test. Moll., 1842, p. 219.—* CONRAD, Pr. Ac. N. Sci. Phila., 1853, p. 264.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* CALKINS, Pr. Ottawa Ac., 1874, p. 47.—* CLESSIN, Conch. Cab. Ano., 1874, p. 121, pl. XXXIX, figs. 2, 3.—* PÆTEL, Conch. Sam., III, 1890, p. 182.

**Margarita* (*Anodonta*) *ovata* LEA, Syn., 1836, p. 52; 1838, p. 30.

**Anodon ovata* CATLOW and REEVE, Conch. Nom., 1845, p. 67.

**Margaron* (*Anodonta*) *ovata* LEA, Syn., 1852, p. 50; 1870, p. 80.

*† *Margarita* (*anodonta*) *salmonia* LEA, Syn., 1836, p. 51; 1838, p. 30.[2]

*† *Anodonta salmonia* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 45, pl. XIV, fig. 41; * Obs., II, 1838, p. 45, pl. XIV, fig. 41.—* TROSCHEL, Arch. für Nat., V, 1839, Pt. 2, p. 238.—* HANLEY, Test. Moll., 1842, p. 218.—* CONRAD, Pr. Ac. N. Sci. Phila, VI, 1853, p. 264.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 184.

**Anodon salmonia* CATLOW and REEVE, Conch. Nom., 1845, p. 68.—* SOWERBY, Conch. Icon., XVI, 1867, pl. XIX, fig. 44.

**Margaron* (*Anodonta*) *salmonia* LEA, Syn., 1852, p. 50; 1870, p. 80.

*† *Anodonta lewisii* LEA, Pr. Ac. N. Sci. Phila., I, 1857, p. 84; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 362, pl. LXII, fig. 187.—* Obs., VIII, p. 44, pl. LXII, fig. 187.—* CLESSIN, Conch. Cab. Ano., 1874, p. 143, pl. XLIX, figs. 5, 6.—* LATCHFORD, Tr. Ottawa F. N. Club, 1882, p. 56.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 181.

**Anodon lewisii* SOWERBY, Conch. Icon., XVII, 1870, pl. XXXV, fig. 142.

**Margaron* (*Anodonta*) *lewisii* LEA, Syn., 1870, p. 80.

† ANODONTA GRANDIS var. FOOTIANA Lea.

**Anodonta footiana* LEA, Pr. Am. Phil. Soc., I, 1840, p. 289; * Tr. Am. Phil. Soc., VIII, 1842, p. 225, pl. XX, fig. 44; * Obs., III, 1842, p. 63, pl. XX, fig. 44.—* CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 264.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* CLESSIN, Conch. Cab. Ano., 1876, p. 227, pl. LXV fig. 5; LXXIV, fig. 3.—* LATCHFORD, Tr. Ottawa F. N. Club, 1882, p. 56.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 179.—* BAKER, Moll. Chicago, Pt. 1, 1898, p. 54, pl. III, figs. 2–4; V, fig. 2; VIII, fig. 5.

**Margaron* (*Anodonta*) *footiana* LEA, Syn., 1852, p. 49; 1870, p. 78.

* *Anodon footiana* SOWERBY, Conch. Icon., XVII, 1867, pl. XIV, fig. 48.

* † *Anodonta marryattana* LEA, Pr. Am. Phil. Soc., I, 1840, p. 289; * Tr. Am. Phil. Soc., VIII, 1842, p. 226, pl. XX, fig. 45; * Obs., III, 1842, p. 64, pl. XX, fig. 45.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 264.—* H. and A. ADAMS, Gen Rec. Moll., II., 1857, p. 503.—* CLESSIN, Conch. Cab. Ano., 1873, p. 72, pl. XXVI, figs. 3, 4.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 181.

* *Margaron* (*Anodonta*) *marryattana* LEA, Syn., 1852, p. 51; 1870, p. 82.

* *Anodon marryattanus* SOWERBY, Conch. Icon., XVII, 1870, pl. XXVIII, fig. 111.

* *Anodonta sulcata* KUSTER, Conch. Cab. Ano., 1873, p. 62, pl. XVIII, fig. 1

[1] I have seen Say's type of *A. grandis*, and it appears to be identical with Lea's *ovata*.

[2] This is an *ovata* which had become diseased internally, probably from the work of a *Trematod*, so that the nacre became roughened or blistered, and generally salmon colored.

[a] *Anodonta nilssonii* KUSTER, part, Conch. Cab. Ano., 1853, p. 61, pl. XVII, figs. 3, 4.
[b] *Anodon imbricata* ANTHONY, Am. Jl. Conch., I, 1865, p. 159, pl. XIV, fig. 1.
[b] *Anodonta imbricata* B. H. WRIGHT, Check List, 1888.—[c] PÆTEL, Conch. Sam., III, 1890, p. 180.
[b] *Anodon subinflata* ANTHONY, Am. Jl. Conch., I, 1865, p. 160, pl. XV, fig. 1.
[a] *Anodonta subinflata* B. H. WRIGHT, Check List, 1888.—[c] PÆTEL, Conch. Sam., III, 1890, p. 185.
[a] ? *Anodon edentulus* SOWERBY, Conch. Icon., XVII, 1867, pl. XVII, fig. 60.
[a] *Anodonta houghtonensis* CURRIER, Shell-bearing Moll. Mich., 1881, p. 14, pl. I, fig. 2.—[c] B. H. WRIGHT, Check List, 1888.

†ANODONTA GRANDIS var. LEONENSIS Lea.

[a] *Anodonta leonensis* LEA, Pr. Ac. N. Sci. Phila., VI, 1862, p. 169; [b] Jl. Ac. N. Sci. Phila., VI, 1866, p. 25, pl. IX, fig. 24; [c] Obs., XI, 1867, p. 29, pl. IX, fig. 24.—[d] CLESSIN, Conch. Cab. Ano., 1874, p. 131, pl. XLII, figs. 3, 4.—[e] B. H. WRIGHT, Check List, 1888.—[f] PÆTEL, Conch. Sam., III, 1890, p. 181.
[a] *Margaron* (*Anodonta*) *leonensis* LEA, Syn., 1870, p. 78.

†ANODONTA GRANDIS var. GIGANTEA Lea.[1]

[a] *Anodonta gigantea* LEA, Tr. Am. Phil. Soc., 1834, p. 1, pl. I, fig. 1; [b] Obs., II, 1838, p. 1, pl. I, fig. 1.—[c] TROSCHEL, Arch. für Nat., V, 1839, Pt. 2, p. 238.—[d] HANLEY, Test. Moll., 1842, p. 219.—[e] CATLOW and REEVE, Conch. Nom., 1845, p. 67.—[f] KUSTER, Conch. Cab. Ano., 1853, p. 6, pl. I, figs. 1, 2.—[g] CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 264.—[h] H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 502.—[i] B. H. WRIGHT, Check List, 1888.—[j] PÆTEL, Conch. Sam., III, 1890, p. 179.
[b] *Margarita* (*Anodonta*) *gigantea* LEA, Syn., 1836, p. 52; 1838, p. 31.
[b] *Margaron* (*Anodonta*) *gigantea* LEA, Syn., 1852, p. 50; 1870, p. 81.
[a] *Anodon gigantea* SOWERBY, Conch. Icon., XVII, 1867, pl. VIII, fig. 18.
[a] *Anodon giganteus* SOWERBY, Conch. Icon., XVII, 1870, pl. XXXVII, fig. 152.
[a] † *Anodonta plana*[2] LEA, Tr. Am. Phil. Soc., V, 1834, p. 48, pl. VII, fig. 18; Obs., I, p. 160, pl. VII, fig 18.—[b] FERUSSAC, Guer. Mag., 1835, p. 25.—[c] HANLEY, Test. Moll., 1842, p. 219.—[d] H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—[e] CLESSIN, Conch. Cab. Ano., 1874, p. 142, pl. XLVI, figs. 1, 2.—[f] B. H. WRIGHT, Check List, 1888.—[g] PÆTEL, Conch. Sam., III, 1890, p. 183.
[a] *Margarita* (*Anodonta*) *plana* LEA, Syn., 1836, p. 52; 1838, p. 30.
[a] *Anodon plana* DE KAY, Zool. of N. Y., Pt. 5, 1843, p. 201, pl. XVII, fig. 232.—[b] CATLOW and REEVE, Conch. Nom., 1845, p. 67.—[c] SOWERBY, Conch. Icon., XVII, 1869, pl. XXIV, fig. 94.
[a] *Margaron* (*Anodonta*) *plana* LEA, Syn., 1852, p. 50; 1870, p. 80.
[a] *Anodonta decliris* CONRAD, Am. Jl. Sci., XXV, 1834, p. 341, pl. I, fig. 11; New F. W. Shells, 1834, p. 73.—[b] FERUSSAC, Guer. Mag., 1835, p. 25.—MÖLLER, Syn., Nov. Gen., 1836, p. 194.—[c] CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 263.
[a] † *Margarita* (*Anodonta*) *decora* LEA, SYN., 1836, p. 52; 1838, p. 30.
[a] *Anodonta decora* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 64, pl. XX, fig. 63; [b] Obs., II, 1838, p. 64, pl. XX, fig. 63.—[c] TROSCHEL, Arch. für Nat., V, 1839, Pt. 2, p. 238.—[d] HANLEY, Test. Moll., 1842, p. 219.—[e] CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 263.—[f] H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 502.—[g] CLESSIN, Conch. Cab. Ano., 1873, p. 71, pl. XVII, figs. 1, 2.—[h] B. H. WRIGHT, Check List, 1888.—[i] PÆTEL, Conch. Sam., III, 1890, p. 178.

[1] A variety of *grandis*. The type is a large, heavy form, with a considerably developed posterior ridge, the shell somewhat truncated above and behind the ridge. I have frequently seen such shells which are evidently pathologic.
[2] This name is written *palna* in above citation; a typographical error, no doubt.

* *Anodon decora* CATLOW and REEVE, Conch. Nom., 1845, p. 66.—* SOWERBY, Conch. Icon., XVII, 1869, pl. XXI, fig. 83.

* *Margaron* (*Anodonta*) *decora* LEA, Syn., 1852, p. 50; 1870, p. 81.

*† *Anondonta harpethensis* LEA, Pr. Am. Phil. Soc., I, 1840, p. 289; Tr. Am. Phil. Soc., VIII, 1842, p. 224, pl. XIX, fig. 42; * Obs., III, 1842, p. 62, pl. XIX, fig. 42.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 264.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 502.—* CLESSIN, Conch. Cab. Ano., 1876, p. 217, pl. LXXII, figs. 1, 2.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 180.

* *Margaron* (*Anadonta*) *harpethensis* LEA, Syn., 1852, p. 50; 1870, p. 81.

* *Anodon harpethensis* SOWERBY, Conch. Icon., XVII, 1869, pl. XXI, fig. 82.

* *Anodon subangulata* ANTHONY, Am. Jl. Conch., I, 1865, p. 158, pl. XIII, fig. 1.

* *Anodonta subangulata*, B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 185.

* *Anodonta opalina* KUSTER, Conch. Cab. Ano., 1853, p. 60, pl. XVI, figs. 1, 2.

* *Anodon opalina* ANTHONY, Am. Jl. Conch., I, 1865, p. 159, pl. XIV, fig. 2.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 182.[1]

* *Anadon mcnielii* ANTHONY, Am. Jl. Conch., II, 1866, p. 144, pl. VI, fig. 1.

* *Anodon subgibbosa* ANTHONY Am. Jl. Conch., II, 1866, p. 144, pl. VI, fig. 2.

* *Anodonta subgibbosa* B. H. WRIGHT, Check List, 1888.—PÆTEL, Conch. Sam., III, 1890, p. 185.

* *Anodon subgibbosus* SOWERBY, Conch. Icon., XVIII, 1870, pl. XXVII, fig. 107.

* *Margaron* (*Anodonta*) *subglobosa* LEA, Syn., 1870, p. 81.[2]

* *Anodon inornata* ANTHONY, Am. Jl. Conch., II, 1866, p. 145, pl. VII, fig. 1.

* *Anodonta orata* SOWERBY, Conch. Icon., XVII, 1868, pl. XXII, fig. 85.

†ANODONTA GRANDIS var. BENEDICTENSIS Lea.

* *Symphynota benedictensis* LEA, Tr. Am. Phil. Soc., V., 1834, p. 104, pl. XVI, fig. 48; * Obs., I, 1834, p. 216, pl. XVI, fig. 48.

* *Anodonta benedictensis* FERUSSAC, Guer. Mag., 1835, p. 25.—* HANLEY, Test. Moll., I, 1842, p. 216.—* C. B. ADAMS, Thompson's Hist. Vt., 1842, p. 164; F. W. and L. S. of Vt., p. 14.—* DE KAY, Zool. N. Y., Pt. 5, 1843, p. 204, pl. XVIII, fig. 235.—* HANLEY, Biv. Shells, 1843, p. 216.—* STIMPSON, Shells of N. Eng., 1851, p. 15.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 263.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* CLESSIN, Conch. Cab. Ano., 1875, p. 163, pl. LIV, figs. 1, 2.—* PÆTEL, Conch. Sam., III, 1890, p. 177.

* *Margarita* (*Anodonta*) *benedictensis* LEA, Syn., 1836, p. 28; 1838, p. 29.

* *Anodon benedictensis* CATLOW and REEVE, Conch. Nom., 1845, p. 66.—* SOWERBY, Conch. Icon., XVII, 1870, pl. XXVI, fig. 99.

* *Margaron* (*Anodonta*) *benedictensis* LEA, Syn., 1852, p. 47.

* *Margaron* (*Anodonta*) *benedictii* LEA, Syn., 1870, p. 75.

* *Anodonta benedictii* LATCHFORD, Tr. Ottawa F. N. Cl., 1882, p. 55.—* B. H. WRIGHT, Check List, 1888.

Anodonta cultrata GOULD, in letter.

Entire Mississippi system; Upper St. Lawrence drainage; Red River of the North; Lake Winnipeg; Manitoba; southwest to Texas; southeast Pennsylvania??

†ANODONTA BEALEI Lea.

* *Anodonta bealei* LEA, Pr. Ac. N. Sci. Phila., VII, 1863, p. 194; * Jl. Ac. N. Sci. Phila., VI, 1866, p. 26, pl. IX, fig. 25; * Obs., XI, 1867, p. 30, pl. IX, fig. 25.—

[1] Kuster and Anthony appear to have applied the same name independently to this species.

[2] As of Anthony.

* CLESSIN, Conch. Cab. Ano., 1874, p. 132, pl. XLIV, figs. 5, 6.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 176.
* *Margaron* (*Anodonta*) *bealei* LEA, Syn., 1870, p. 81.

Texas to Kansas.

† ANODONTA TEXASENSIS Lea.[1]

* *Anodonta texasensis* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 113; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 366, pl. LXIII, fig. 191; * Obs., VIII, 1860, p. 48, pl. LXIII, fig. 191.—* CLESSIN, Conch. Cab. Ano., 1873, p. 109, pl. XXXIII, figs. 7, 8.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 185.
* *Anodon texasensis* SOWERBY, Conch. Icon., XVII, 1870, pl. XXXVI, fig. 146.
* *Margaron* (*Anodonta*) *texasensis* LEA, Syn., 1870, p. 81.

Texas.

† ANODONTA DANIELSII Lea.

* *Anodonta danielsii* LEA, Pr. Ac. N. Sci. Phila., II, 1858, p. 139; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 365, pl. LXIII, fig. 190; * Obs., VIII, 1860, p. 47, pl. LXIII, fig. 190.—* CLESSIN, Conch. Cab. Ano., 1873, p. 108, pl. XXXIII, figs. 1, 2.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 178.
* *Margaron* (*Anodonta*) *danielsii* LEA, Syn., 1870, p. 78.
* *Anodonta danielsii* SOWERBY, Conch. Icon., XVII, 1870, pl. XXXVI, fig. 148.
* *Margaritana danielsii* PÆTEL, Conch. Sam., III, 1890, p. 173.

Kansas; Indian Territory.

† ANODONTA OPACA Lea.

* *Anodonta opaca* LEA, Tr. Am. Phil. Soc., X, 1852, p. 285, pl. XXV, fig. 46; * Obs., V, 1852, p. 41, pl. XXV, fig. 46.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 264.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* CLESSIN, Conch. Cab. Ano., 1875, p. 209, pl. LXIV, figs. 1, 2.—* B. H. WRIGHT, Check List, 1888.
* *Margaron* (*Anodonta*) *opaca* LEA, Syn., 1852, p. 50; 1870, p. 80.

Louisiana; Mississippi; north to Kansas.

† ANODONTA STEWARTIANA Lea.

* *Anodonta stewartiana* LEA, Tr. Am. Phil. Soc., V, 1834, p. 47, pl. VI, fig. 17; Obs., I, 1834, p. 159, pl. VI, fig. 17.—* FERUSSAC, Guer. Mag., 1835, p. 25.—* HANLEY, Test. Moll., 1842, p. 220; * Biv. Shells, 1843, p. 220.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 264.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* CLESSIN, Conch. Cab. Ano., 1874, pl. XLVIII, figs. 3, 4.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 185.
* *Margarita* (*Anodonta*) *stewartiana* LEA, Syn., 1836, p. 52; 1838, p. 31.
* *Anodon stewartiana* CATLOW and REEVE, Conch. Nom., 1845, p. 68.
* *Anodon stewartianus* SOWERBY, Conch. Icon., XVII, 1870, pl. XXXII, fig. 133.
* *Margaron* (*Anodonta*) *stewartiana* LEA, Syn., 1852, p. 51; 1870, p. 81.
*† *Anodonta virens* LEA, Tr. Am. Phil. Soc., X, 1852, p. 290, pl. XVIII, fig. 53; * Obs., V, 1852, p. 46, pl. XXVIII, fig. 53.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 267.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* B. H. WRIGHT, Check List, 1888.
* *Margaron* (*Anodonta*) *virens* LEA, Syn., 1852, p. 51; 1870, p. 81.
* *Anodon virens* SOWERBY, Conch. Icon., XVII, 1870, pl. XXXIV, fig. 138.

Arkansas; Louisiana; Texas.

[1] A very young, broken shell, greatly inflated in the post basal region, is all that Lea has in his collection. It may be a distinct species, or a mere variety of *grandis*.

†ANODONTA CORPULENTA Cooper.

**Anodonta corpulenta* COOPER, App. to Narrative, Exp. Miss. to It. L., 1834, p. 154.—* MÖLLER, Syn. Nov. Gen., 1836, p. 193.—* COOPER, Second App. School. Expl. Exp., 1855, p. 516.—* CALKINS, Pr. Ottawa Ac. Sci., 1874, p. 47.—* B. H. WRIGHT, Check List, 1888.

**Anodon corpulenta* SOWERBY, Conch. Icon., XVII, 1870, pl. XXXII, fig. 129.

**Margaron (Anodonta) corpulenta* LEA, Syn., 1870, p. 81.

Missouri River; Upper Mississippi River drainage; east to Indiana; Tyler, Texas.? Appears to be replaced in the South by *A. stewartiana*.

†ANODONTA LINNEANA Lea.

**Anodonta linneana* LEA, Tr. Am. Phil. Soc., 1852, p. 289, pl. XXVII, fig. 51; *Obs., V, 1852, p. 45, pl. LXXVII, fig. 51.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 264.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 502.—* CLESSIN, Conch. Cab. Ano., 1874, p. 117, pl. XXXVI, figs. 5, 6.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 181.

**Margaron (Anodonta) linneana* LEA, Syn., 1852, p. 51; 1870, p. 81.

**Anodon linneanus* SOWERBY, Conch. Icon., XVII, 1870, pl. XXXV, fig. 144.

Louisiana; Texas.

†ANODONTA GLOBOSA Lea.

** Margarita (Anodonta) globosa* LEA, Syn., 1836, p. 52.

**Anodonta globosa* LEA, Pr. Am. Phil. Soc., II, 1841, p. 31; *Tr. Am. Phil. Soc., VIII, 1842, p. 241, pl. XXIV, fig. 56; *Obs., III, 1842, p. 79, pl. XXIV, fig. 56.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 502.—* CLESSIN, Conch. Cab. Ano., 1875, p. 213, pl. LXV, figs. 3, 4.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 180.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 529, pl. LXVIII, figs. 1, 1*a*.

**Anodon globosa* CATLOW and REEVE, Conch. Nom., 1845, p. 67.—* SOWERBY, Conch. Icon., XVII, 1870, pl. XXXV, fig. 141.

**Margaron (Anodonta) globosa* LEA, Syn., 1852, p. 51; 1870, p. 81.

**†Anodon nopalatensis* SOWERBY,[1] Conch. Icon., XVII, 1867, pl. XVI, fig. 58.—* CLESSIN, Conch. Cab. Ano., 1876, p. 223, pl. LXXIII, fig. 3.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 182.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 531.

**Margaron (Anodonta) nopalatensis* LEA, Syn., 1870, p. 81.

Mexico.

ANODONTA TABASCOENSIS Morelet.

**Anodonta tabascoensis* MORELET, Jl. de Conch., XXXII, 1884, p. 124.—* PÆTEL, Conch. Sam., III, 1890, p. 185.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 530, pl. LXII, fig. 1.

Tabasco, Mexico.

[1] Lea's *globosa* is a young shell. Sowerby's *nopalatensis* is the adult. There is a magnificent specimen in the collection of the Philadelphia Academy of Natural Sciences, 7½ inches long and 5½ inches high.

ANODONTA MICANS Anthony.

**Anodonta micans* ANTHONY, Am. Jl. Conch., I, 1865, p. 162, pl. XVI, fig. 1.—* B. H. WRIGHT, Check List, 1888.

**Margaron* (*Anodonta*) *micans* LEA, Syn., 1870, p. 78.

Said to come from Texas. I do not know it, nor where it groups, though it seems something like *A. kennicottii*.

ANODONTA LURULENTA Morelet.

**Anodonta lurulenta* MORELET, Test. Nov. Pt. 1, 1829, p. 28.—*FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 523, pl. LXIV, figs. 6, 6*a*.

Guatemala; Yucatan.

†ANODONTA KENNICOTTII Lea.

**Anodonta kennicottii* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 56; *Jl. Ac. N. Sci. Phila., V, 1862, p. 214, pl. XXXIII, fig. 283; * Obs., IX, 1863, p. 6, pl. XXXIII, fig. 283.—* CLESSIN, Conch. Cab. Ano., 1874, p. 153, pl. XLIX, figs. 3, 4.—* B. H. WRIGHT, Check List, 1888.

**Margaron* (*Anodonta*) *kennicottii* LEA, Syn., 1870, p. 78.

*† *Anodonta simpsoniana* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 56; *Jl. Ac. N. Sci. Phila., V, 1862, p. 212, pl. XXXII, fig. 281; * Obs., IX, 1863, p. 34, pl. XXXII, fig. 281.—*CLESSIN, Conch. Cab. Ano., 1874, p. 119, pl. XXXVII, figs. 5, 6.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 184.

**Margaron* (*Anodonta*) *simpsoniana* LEA, Syn., 1870, p. 78.

**Anodon simpsonianus* SOWERBY, Conch. Icon., XVII, 1870, pl. XXXVII, fig. 153.

*† *Anodonta dallasiana* LEA, Pr. Ac. N. Sci. Phila., VII, 1863, p. 190; *Jl. Ac. N. Sci. Phila., VI, 1866, p. 29, pl. XI, fig. 28; * Obs., XI, 1863, p. 33, pl. XI, fig. 28.—*CLESSIN, Conch. Cab. Ano., 1873, p. 107, pl. XXXIII, figs. 3, 4.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 178.

**Margaron* (*Anodonta*) *dallasiana* LEA, Syn., 1870, p. 78.

Upper and middle St. Lawrence River system; northwest into the Mackenzie drainage.

†ANODONTA PEPINIANA Lea.

**Anodonta pepinianus* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 96, pl. XVI, fig. 51.—* TROSCHEL, Arch. für Nat., V, 1839, II, p. 239.

**Anodon pepinianus* SOWERBY, Conch. Icon., XVII, 1870, pl. XXXVI, fig. 150.

**Anodonta pepiniana* LEA, Obs., II, 1838, p. 96, pl. XVI, fig. 51.—HANLEY, Test. Moll., 1842, p. 220; Biv. Shells, 1843, p. 220.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 264.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—*CLESSIN, Conch. Cab. Ano., 1874, p. 158, pl. LIII, figs. 1, 2.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 183.

**Margarita* (*Anodonta*) *pepiniana* LEA, Syn., 1838, p. 30.

**Margaron* (*Anodonta*) *pepiniana* LEA, Syn., 1872, p. 49; 1850, p. 78.[1]

Upper and middle St. Lawrence drainage; Lake Winnipeg.

[1] Although this resembles to some extent the so-called *Anodonta modesta*, and is sometimes slightly incurved in front of the beaks, the beak sculpture is that of the *A. grandis* group, and quite different from that of *A. modesta*.

ANODONTA LUGUBRIS Say.

Anodonta lugubris SAY, N. Harm. Diss. II, 1829, p. 340.[1]

The following are indeterminate and spurious Anodontas:

**Anodon anatinus* SOWERBY, Rich. Faun. Boreal Am., III, 1836, p. 316.

Saskatchewan River; probably *A. implicata*.

**Anodonta apollonica* BOURGUIGNAT, Moll. Aceph. Eur., 1881, p. 91.

Asia Minor.

**Anodonta aureus* PÆTEL, C. Sam., III, 1890, p. 176.

China.

**Anodonta brandti* DROUET, Jl. de Conch., 1888, p. 108.
**Anodonta callifera* VON MARTENS, Proc. Zool. Soc., 1860, p. 15.
**Anodonta chantrei* BOURGUIGNAT, J. de Conch., 1883, p. 187.
**Anodonta chinensis* PÆTEL, C. Sam., III, 1890, p. 177.
**Anodon cochlearis* SOWERBY, C. Icon., XVII, 1870, pl. XXXIII, fig. 135. Probably a *glabaris*.
**Anodonta cornea* PHILIPPI, Menke's Zeits., 1848, p. 130.
**Anodonta curvatus* JAY, Cat., 1850, p. 27.
Anodon dalei LESSON, Oeuvres Buffon, I, p. 155, pl. III, fig. 1.?
**Anodonta dignota* RAFINESQUE, Cont. Mon., 1831, p. 6.
**Anodonta fragilis* FITZINGER, Syst. Verz., 1833, p. 120.
**Anodonta gallandi* BOURGUIGNAT, Mat. Aceph. Eur., 1881, p. 95.
**Anodonta hockingensis* CALL, Am. Nat., 1880, p. 529, Moore, manuscript. According to Call, it is *A. grandis* Say.
**Anodonta inflata* RAFINESQUE, Cont. Monog., 1831, p. 6.
**Anodonta laminata* ROCHEBRUNE, Bull. Soc. Philom., VI, 1882, p. 40.
**Anodonta martensi* CLESSIN, C. Cab. Ano., 1876, p. 181, pl. LXIII, fig. 2.
**Anodonta ohioensis* RAFINESQUE, An. Gen. Sci, Brux., V, 1820, p. 316.
Anodonta ovata STARK, Elements Nat. Hist., II, 1822, p. 90.
**Anodon pictus* SWAINSON, Ex. Conch., 2d ed., 1841, p. 39.
**Anodonta polymorpha* LEA, Syn., 1870, p. 84. Credited to Kuster. Where?
**Anodonta pseudodontopsis* BOURGUIGNAT, Jl. de Conch., 1883, p. 187.
**Anodontites radiata* VALENCIENNES, Enc. Meth., 1824, p. 147, pl. CCIII, fig. 4 = *Modiolaria nigra*.
**Anodonta recurvirostra* LEA, Syn., 1870, p. 84; Kuster (?).
**Anodonta rugifera* DUNKER, Mal. Bl., 1858, p. 225. Probably a *Spatha*.
**Anodonta schlaflii* MOUSSON, J. de Conch., 1874, p. 51.
**Anodonta sedakowi* SIECMASCHKO, Bull. de Ac. Petersb., 1849, p. 225.
**Anodonta somersi* CALL, Am. Nat., 1880, p. 529, credited to Moore, manuscript, *A. grandis* fide Call.
**Anodonta subrostrata* PHILIPPI, Mal. Bl., 1869, p. 39.
**Anodonta subsinuata* PHILIPPI, Mal. Bl., 1869, p. 41. A *glabaris* probably.
**Anodonta sulcosa* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503. Said to be of Conrad. Where?
**Anodon triangularis* SOWERBY, Conch. Icon., XVII, 1867, pl. XV, fig. 56.
**Anodonta trigona* HELD, Isis., 1836, p. 280, *A. cygnea* probably. The name was used by Spix in 1827.

[1] I do not know what this is. It is said to come from the Cumberland River, and is very likely one of the forms of *A. grandis*. I have omitted the synonymy.

**Anodonta truncata* KUSTER, Faun. Dalm., 1866, p. 131.
**Anodonta tunizana* MORELET, J. de Conch., 1864, p. 156.
**Anodonta viridis* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503, as of Lea. Lea did not describe it.

Genus COLLETOPTERUM Bourguignat, 1881.

(Type, *Anodonta letourneuxi* Bourguignat.)

Colletopterum BOURGUIGNAT, Lettres Malacologiques, 1881, p. 45.

Shell inflated, thin, winged in front and behind, hinge arched, very short, without teeth, but with a feeble lateral lamella shown in pronounced relief; ligament internal.

Animal unknown.

COLLETOPTERUM LETOURNEUXI Bourguignat.

Anodonta letourneuxi BOURGUIGNAT, Annales Mal., I, 1870, p. 76.
**Anodonta* (*Colletopterum*) *letourneuxi* WESTERLUND, Faun. Pal., II, 1890, Pt. 7, p. 310.
Colletopterum letourneuxi BOURGUIGNAT, Lett. Mal., 1882, p. 46; * Bull. Soc. Mal. Fr., VII, 1890, pl. VI, figs. 1, 2.

Servia, at Belgrade.

COLLETOPTERUM PRÆCLARUM Bourguignat.

Anodonta præclara BOURGUIGNAT, Ann. Mal., I, 1870, p. 78.
**Anodonta* (*Colletopterum*) *præclara*, WESTERLUND, Faun. Pal., II, 1890, Pt. 7, p. 310.
Colletopterum præclarum BOURGUIGNAT, Lett. Mal., 1882, p. 46.

Bulgaria, at Rutschuk.

COLLETOPTERUM EXIMIUM Bourguignat.

Anodonta eximia BOURGUIGNAT, Ann. Mal., I, 1870, p. 80.
**Anodonta* (*Colletopterum*) *eximia* WESTERLUND, Faun. Pal., II, 1890, Pt. 7 p. 310.

Wallachia at Giurgevo.

COLLETOPTERUM TANOUSI Bourguignat.

Anodonta tanousi BOURGUIGNAT, Ann. Mal., I, 1870.
**Anodonta* (*Colletopterum*) *tanousi* WESTERLUND, Faun. Pal., II, 1890, Pt. 7, p. 311.

Servia at Belgrade.[1]

Genus GABILLOTIA Servain, 1890.

(Type, *Anodonta pseudodopsis* Locard.)

Gabillotia SERVAIN, Bull. Soc. Mal. Fr., VII, 1890, p. 296.

Shell large, subsolid, subcompressed, more or less rhomboid gaping behind; beaks low, with fine, broken, concentric sculpture; epidermis

[1] I am wholly unacquainted with this genus. All the species are from the Danube, and if the characters are accurately given it may possibly be a valid genus, though Westerlund gives it subgeneric rank under *Anodonta*. It is more than likely, however, that all the so-called species are merely specimens of the well-known *Anodonta cygnea*, having a dorsal wing which conceals the ligament, and something which may be vestiges of lateral teeth. Such examples occur among Anodontas in other parts of the world.

shining; teeth rudimentary, one in each valve, sometimes rather sharp pointed and flattened; hinge with occasional vestiges of laterals; epidermal matter mingled with the nacre on the hinge; nacre brilliant, often finely radially ridged, especially at the palleal line.

Animal unknown.

GABILLOTIA PSEUDODOPSIS Locard.

**Anodonta pseudodopsis* LOCARD, Mal. d'lacs Tib., 1883, p. 61, pl. XIXbis., figs. 1-3.

**Gabillotia pseudodopsis*, SERVAIN, Bull. Soc. Mal. Fr., VII, 1890, p. 296, fig.

Syria.

GABILLOTIA LOCARDI Servain.

**Gabillotia locardi* SERVAIN, Bull. Soc. Mal. Fr., VII, 1890, p. 296, pl. V, figs. 1, 2.

Asia Minor.

GABILLOTIA OPPERTI Bourguignat.

* *Unio opperti Bourguignat*, Rev. et Mag., VIII, 1856, p. 71, pls. VIII, fig. 6; IX, fig. 1.

* *Pseudodon opperti* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 182.

* *Margaritana opperti* PÆTEL, Conch. Sam., III, 1890, p. 173.

* *Margaritana euphratica* KOBELT, Icon., new ed., II, 1886, p. 26, pl. XLV, fig. 266.

Euphrates River.

† GABILLIOTIA EUPHRATICA Bourguignat.

* *Unio euphraticus* BOURGUIGNAT, Test. Nov., 1852, p. 28; * Cat. Rais., 1853, p. 75, pl. IV, figs. 1-3; * Rev. et Mag., VIII, 1856, p. 72.

* *Pseudodon euphratica* CONRAD, Am. Jl. Conch., I, 1865, p. 233.

Margaritana euphratica VON MARTENS, Vorderas Conch., 1874, p. *—KOBELT, Icon., new ed., II, 1886, p. 26, pl. XLV, fig. 266.—* PÆTEL, Conch. Sam., III, 1890, p. 173.

* *Leguminaia euphratica* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 188.

* *Unio churchillianus* SOWERBY, Conch. Icon., XVI, 1868, pl. XCVI, fig. 526.

† GABILLOTIA EUPHRATICA var. CHURCHILLIANUS Bourguignat.

* *Unio churchillianus* BOURGUIGNAT, Rev. et Mag., 1857, p. 18, pl. II, figs. 1-4.—* PÆTEL, Conch. Sam., III, 1890, p. 148.

* *Pseudodon churchillianus* WESTERLUND, Faun. Pal., II, Pt .7, 1890, p. 183.

*† *Monocondylæa rhomboidea* LEA, Pr. Ac. N. Sci., Phila., III, 1859, p. 187; * Jl. Ac. N. Sci., Phila., IV, 1860, p. 263, pl. XLII, fig. 143; * Obs., VII, 1860, p. 81, pl. XLII, fig. 143.

* *Margaron (Monocondylæa) rhomboidea* LEA, Syn., 1870, p. 72.

* *Microcondylæa rhomboidea* PÆTEL, Conch. Sam., III, 1890, p. 175.

* *Leguminaia rhomboidea* KOBELT, Icon., new ed., VI, 1893, p. 94, pl. CLXXVIII, figs. 1124, 1125.

* *Unio rhomboideus* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXIX, fig. 480.

* *Pseudodon rhomboideus* WESTERLUND, Faun. Pal., II, pl. VII, 1890, p. 183.

Asiatic Turkey.

Genus LEGUMINAIA Conrad, 1865.

(Type, *Monocondylæa mardinensis* Lea.)

Leguminaia CONRAD, Am. Jl. Conch., I, 1865, p. 233.
Microcondylæa VEST, Verh. Mitth. Sieben. Ver. Nat., 1866, p. 201.
Microcondylus DROUET, Jl. de Conch., 1879, p. 138.

Shell rhomboid-elliptical, slightly biangulate behind; posterior ridge faint and double; beaks anterior, sculptured with fine, concentric ridges which are sometimes slightly corrugated, but which show a tendency to form two rounded loops; surface smooth or with very faint corrugations on the posterior slope; epidermis rayless or nearly so; a single tooth in each valve, that in the left under the beak, that in the right in front of it, teeth smooth; epidermal and ligamentary matter mingled with the nacre along the hinge; the two front anterior muscle scars united, the hinder distinct, posterior scars faint; beak cavities shallow; dorsal scars few, irregularly disposed.

Animal with the outer branchiæ adherent to the mantle throughout their entire length; inner free from the abdominal sac. (Drouet.)

Section LEGUMINAIA Conrad, 1865.

(Type, *Monocondylæa mardinensis* Lea.)

Shell somewhat solid, elliptical to rhomboid; beaks rather full; teeth strong, with sometimes a slight secondary tooth in the left valve, well in front.

Group of *Leguminaia mardinensis*.

Characters as in the subgenus.

† LEGUMINAIA MARDINENSIS Lea.

**Monocondylæa mardinensis* LEA, Pr. Ac. N. Sci., Phila., VIII, 1864, p. 286; *Jl. Ac. N. Sci. Phila., VI, 1869, p. 252, pl. XXX, fig. 67; *Obs., XII, 1869, p. 12, pl. XXX, fig. 67.

**Leguminaia mardinensis* CONRAD, Am. Jl. Conch., I, 1865, p. 233.—*LOCARD, Arch. Mus. Lyon., III, 1883, p. 250.—*WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 188.—KOBELT, Icon., new ed., VI, 1893, p. 92, pl. CLXXVII, figs. 1122, 1123.

**Margaron* (*Monocondylæa*) *mardinensis* LEA, Syn., 1870, p. 73.

**Margaritana mardinensis* CLESSIN, Conch. Cab. Ano., 1876, p. 266, pl. LXXXIII, figs. 1, 2.—*PÆTEL, Conch. Sam., III, 1890, p. 173.

LEGUMINAIA MARDINENSIS var. CHANTREI Locard.

**Leguminaia chantrei* LOCARD, Arch. Mus. Lyon, III, 1883, p. 252, pl. XIXbis, figs. 8–10.—*KOBELT, Icon, 1st sup., 1895, p. 23, pl. IV, fig. 3.—*WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 198.

**Monocondylæa chantreyi* PÆTEL, Conch. Sam., III, 1890, p. 174.

**Leguminaia bourguignati* LOCARD, Arch. Mus. Lyon, III, 1883, p. 252, pl. XIXbis, figs. 11–18.—WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 189.

Southern Turkey in Asia.

LEGUMINAIA TRIPOLITANA Bourguignat.[1]

**Unio tripolitanus* BOURGUIGNAT, Test. Nov., 1852, p. 28; *Cat. Rais., 1853, p. 75, pl. IV, figs. 12, 12*a*; *Rev. et Mag., 1856, p. 72.—*PÆTEL, Conch. Sam., III, 1890, p. 155.

**Pseudodon tripolitanus* CONRAD, Am. Jl. Conch., I, 1865, p. 233.

**Margaritana tripolitana* CLESSIN, Conch. Cab. Ano., 1876, p. 265, pl. LXXXV, figs. 6, 7.—*PÆTEL, Conch. Sam., III, 1890, p. 174.

**Leguminaia tripolitana* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 190.

Tripoli, Syria.

†LEGUMINAIA WHEATLEYI Lea.

**Monocondylæa wheatleyi* LEA, Pr. Ac. N. Sci, Phila., VI, 1862, p. 176; *Jl. Ac. N. Sci., Phila., V, 1863, p. 400, pl. L, fig. 307; *Obs., X, 1863, p. 34, pl. L, fig. 307.

**Pseudodon wheatleyi* CONRAD, Am. Jl. Conch., I, 1865, p. 233.

**Margaron* (*Monocondylæa*) *wheatleyi* LEA, Syn., 1870, p. 72.

**Microcondylæa* (*Margaritana*) *wheatleyi* CLESSIN, Conch. Cab. Ano., 1875, p. 259, pl. LXXXI, figs. 1, 2.

**Mycrocondylæa wheatleyi* PÆTEL, Conch. Sam., III, 1890, p. 175.

**Leguminaia wheatleyi* LOCARD, Arch. Mus. Lyon, III, 1883, p. 276.—WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 189.

Southern Turkey in Asia.

LEGUMINAIA SAULCYI Bourguignat.

**Unio saulcyi* BOURGUIGNAT, Test. Noviss., 1852, p. 27; *Cat. Rais., 1853, p. 74, pl. III, figs. 1-3.—*TRISTRAM, Pr. Zool. Soc. Lond., 1865, p. 544.

**Pseudodon saulcyi* CONRAD, Am. Jl. Conch., I, 1865, p. 233.

**Margaron* (*Monocondylæa*) *saulcyi* LEA, Syn., 1870, p. 72.

**Microcondylæa saulcyi* CLESSIN, Conch. Cab Ano., 1876, p. 260, pl. LXXXVI, figs. 4, 5.—*PÆTEL, Conch. Sam., III, 1890, p. 175.—*WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 190.

Syria.

LEGUMINAIA MICHONII Bourguignat.

**Unio michonii* BOURGUIGNAT, Test. Nov., 1852, p. 27; *Cat. Rais., 1853, p. 74, pl. III, figs. 10-12; Rev. et. Mag., 1856, p. 72.

**Pseudodon michonii* CONRAD, Am. Jl., I, 1865, p. 233.

**Margaritana michonii* PÆTEL, Conch. Sam., III, 1890, p. 173.

**Leguminaia michonii* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 190.

Jaffa, Syria.

(Group of *Leguminaia locardi.*)

Shell nearly evenly elliptical, somewhat inflated, rather thin, subtransparent; beaks near the center, rather full, curved forward, with irregular undulations; epidermis bright yellowish brown; nacre brilliant; pseudocardinals very obtuse, rather prominent and thick.

[1] Probably a mere variety of *L. mardinensis.*

LEGUMINAIA LOCARDI Simpson.

**Pseudodon chantrei* LOCARD, Arch. Mus. Lyon, III, 1883, p. 254, pl. XIXbis, figs. 4-7.[1]—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 183.

Lake Antioch, Syria.

Section **MICROCONDYLÆA** Vest. 1866.

(Type, *Anodonta uniopsis* LAMARCK.[2])

Shell inequilateral, elongate, subrhomboid or elliptical, compressed, rather thin, with low beaks; teeth rudimentary, much compressed, a single one in each valve; nacre bluish or purplish white.

Animal, as in typical *Leguminaia*.

†LEGUMINAIA UNIOPSIS Lamarck.[3]

**Anodonta uniopsis* LAMARCK, An. sans Vert., VI, 1819, p. 86.—* HANLEY, Test. Moll., 1842, p. 217; * Biv. Shells, 1843, p. 217.—* DESHAYES, Tr. Element., II, 1853, p. 218, pl. XXX, fig. 4.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* PÆTEL, Conch. Sam., III, 1890, p. 186.

**Margarita* (*Anodonta*) *uniopsis* LEA, Syn., 1836, p. 50; 1838, p. 30.

**Anodon uniopsis* CATLOW and REEVE, Conch. Nom., 1845, p. 68.

**Margaron* (*Anodonta*) *uniopsis* LEA, Syn., 1852, p. 49; 1870, p. 78.

**Unio depressa* C. PFEIFFER, Nat. Deuts. Moll., 1825, Pt. 2, p. 32, pl. VIII, figs. 3, 4.[4]

**Leguminaia depressa* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 191.

**Alasmodonta compressa* MENKE, Syn., 1828, p. 106.—* PORRO, Mal. Como., 1838, p. 113.—* STABILE, Faun. Lug., 1845, p. 60, pl. III, fig. 71.

**Unio bonelli* ROSSMÄSSLER, Icon., II, 1835, p. 24, pl. IX, fig. 134.[5]—* HANLEY, Test. Moll, 1842, p. 212; * Biv. Shells, 1843, p. 212, pl. XXIII, fig. 59.—* CATLOW and REEVE, Conch. Nom., 1845, p. 56.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXIX, fig. 414.

**Margarita* (*Margaritana*) *bonellii* LEA, Syn., 1836, p. 45; 1838, p. 27.

**Margaritana bonellii* KUSTER, Conch. Cab. Unio, 1862, p. 296, pl. XCIX, fig. 1.—* KOBELT, Icon., 1884, p. 62, pl. XXV, figs. 208, 209; XXVI, fig. 210.

**Margaron* (*Margaritana*) *bonellii* LEA, Syn., 1852, p. 43; 1870, p. 72.

**Baphia bonellii* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 498.

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[1] Locard described this as a *Pseudodon*, and previously in the same year described a *Leguminaia chantrei*, which seems to me to be a mere variety of *L. mardinensis*. As both are undoubtedly Leguminaias, and as the present species was the last described, I am compelled to change its name.

[2] Lamarck's brief description of *Anodonta uniopsis* entirely agrees with the shell commonly known as *Microcondylæa* or *Monocondylæa bonelli*. The statement that the ligament passes into the hinge exactly fits this, and this is one of the best generic characters of *Leguminaia*.

[3] The amount of variation of this species is very great. In many cases the posterior end has evidently been injured by unfavorable environment, and the shell is dwarfed and variously distorted, and sometimes a good deal thickened. Of course every individual variation and distortion of this kind has been seized on by the New School and elevated to specific rank. I have seen only what seemed to me a single species of this subgenus, and nothing which really was worthy of a varietal name.

[4] Credited to Muhlfeld in literature.

[5] Credited by Rossmässler to Ferussac, but without other reference. Lea says Ferussac's manuscript labels, neither of which constitutes a published description.

**Anodon bonelli* SOWERBY, Conch. Icon., XVII, 1867, pl. XI, fig. 34.

**Microcondylaea bonelli* CLESSIN, Conch. Cab. Ano., 1861, p. 257; Moll. Osterr., 1887, p. 719, figs. 486, 487.—* PÆTEL, Conch. Sam. III, 1890, p. 175.

**Microcondylus bonelli* DROUET, Jl. de Conch., XXVI, 1879, p. 138; Union. Italie, 1885, p. 110.

**Margaritana* (*Microcondylaea*) *bonellii* KOBELT, Icon., 1884, p. 62, pl. XXV, figs. 208, 209.

**Leguminaia bonellii* WESTERLUND Faun. Pal., II, Pt. 7, 1890, p. 191.

South central Europe.

Genus LASTENA Rafinesque, 1820.

(Type, *Lastena lata* Rafinesque.)

Lastena RAFINESQUE, Ann. Gen. Sci. Phys. Brux., 1820, p. 316.
Odatelia RAFINESQUE, Atlantic Jl. and Friend., 1832, p. 154.
Leptodea (*Rafinesque*) CONRAD, Pr. Ac. N. Sci. Phila., 1853, p. 262.

Shell elongated, subsolid, inequilatural, generally wider in front, rounded-truncate at anterior base, pointed at post-basal region, and having a low posterior ridge, with one or more secondary ridges above it; beaks low, sculpture consisting of a few coarse, irregular, longitudinal folds; epidermis shining, often rayed; a single imperfect tooth occurs in each valve, and sometimes vestiges of laterals; there is one roughened dorsal scar in the shallow beak cavity; muscle scars very large, deep and distinct, the posterior greatly elongated; nacre purplish, shading to blue at the edge; palleal line radially ridged.

Animal with very long branchiæ, inner and outer about alike in size and form, projecting free slightly behind, the inner free from the abdominal sac nearly the whole length, brownish throughout; palpi long, large; mantle thickened at edge, brown, black above; branchial opening large, with heavy papillæ; anal opening large, without papillæ; superanal opening united below; foot very large when living, club-shaped, capable of great extension. No gravid specimens have been seen, but the outer branchiæ are probably used as a marsupium.

† LASTENA LATA Rafinesque.

**Anodonta* (*Lastena*) *lata* RAFINESQUE, Ann. Gen. Sci. Brux., V, 1820, p. 317, pl. LXXXII, figs. 17, 18.

**Anodonta lata* FERUSSAC, Guer. Mag., 1835, p. 25.—* CHENU, Bib. Conch., 1st ser., III, 1845, p. 26, pl. III, figs. 17, 18.

**Leptodea lata* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 262.

**Anodon lata* SOWERBY, Conch. Icon., XVII, 1867, pl. XIX, fig. 76.

**Unio latus* CONRAD, New F. W. Shells, 1834, p. 70.—* SAY, Am. Conch., VI, 1834.—* KUSTER, Conch. Cab. Unio, 1861, p. 388, pl. LXVII, fig. 5.

Unio dehiscens SAY, N. Harm. Diss., II, 1829, p. 308; * Am. Conch., III, 1830, pl. XXIV.—* DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 554; 3d ed., II, 1839, p. 674.—* HANLEY, Test. Moll., 1842, p. 204; * Biv. Shells, 1843, p. 204, pl. XXI, fig. 36.—* CHENU, Bib. Conch., 1st ser., III, 1845, p. 32, pl. IX, figs. 7-9.—* CATLOW and REEVE, Conch. Nom., 1845, p. 58.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXV, fig. 393.

**Margarita* (*Unio*) *dehiscens* LEA, Syn., 1836, p. 35; 1838, p. 23.

* *Hemilastena dehiscens* AGASSIZ, Arch. für Nat., I, 1852, p. 50.

* *Margaron* (*Margaritana*) *dehiscens* LEA, Syn., 1852, p. 43; 1870, p. 69.

* *Baphia dehiscens* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 499.

* *Margaritana dehiscens* CLESSIN, Conch. Cab. Ano., 1873, p. 274, pl. XXIV, figs. 3, 4.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 173.

* *Anodonta dehiscens* PÆTEL, Conch. Sam., III, 1890, p. 178.

* † *Unio oriens* LEA, Tr. Am. Phil. Soc., IV, 1834, p. 73, pl. VI, fig. 5; Obs., I, 1834, p. 83, pl. VI, fig. 5.—* CHENU, Ill. Conch., 1858, pl. XIV, figs. 2, 2*a*, 2*b*.— KUSTER, Conch. Cab., 1861, p. 222, pl. LXXV, fig. 2.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXIII, fig. 314.

* *Unio hildrethi* DELESSERT, Rec. Coq. Lam., 1841, pl. XIX, figs. 4*a*, 4*b*.

Ohio, Cumberland, and Tennessee river systems.

Genus SOLENAIA Conrad, 1868.

(Type, *Mycetopus emarginatus* Lea.)

Solenaia CONRAD, Am. Jl. Conch., IV, 1869, p. 249.

Shell greatly elongated, falcate, rather thin, narrower and rounded in front, the upper anterior portion being strongly sulcate, gaping at anterior base and behind, having a strong posterior ridge that ends in a point at the post base; beaks low; sculpture of slightly double-looped concentric ridges; epidermis rayless; hinge line narrow; teeth rudimentary, being mere vestiges of one or more lamellar laterals in each valve; dorsal scars numerous, in a line under the hinge; anterior scars faint; posterior elongated; palleal line with a distinct posterior sinus.

According to Fischer the foot is enormously developed for the purpose of burrowing, as in *Mycetopoda*. It is probable that the mantle is closed behind into two siphons.

(Group of *Solenaia emarginata*.)

Anterior region much narrowed, drawn out in the direction of the anterior base, marked off from the rest of the shell by a faint ridge.

† SOLENAIA EMARGINATA Lea.

* *Mycetopus emarginatus* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 308; * Jl. Ac. N. Sci. Phila., V, 1863, p. 398, pl. L, fig. 305; * Obs., X, 1863, p. 34, pl. I, fig. 305.—SOWERBY, Conch. Icon., XVI, 1868, pl. II, fig. 6.—* FISCHER, Jl. de Conch., XXXVIII, 1890, p. 11.—* PÆTEL, Conch. Sam., III, 1890, p. 186.

* *Platiris* (*Mycetopus*) *emarginatus* LEA.

* *Anodonta emarginatus* CLESSIN, Conch. Cab. Ano., 1875, p. 169, pl. LV, figs. 5, 6.

* *Mycetopus* (*Solenaia*) *emarginatus* FISCHER, Bull. Soc. d'Autun, IV, 1891, p. 135.

Siam.

†SOLENAIA FALCATA Higgins.

**Mycetopus falcatus* HIGGINS, Proc. Zool. Soc. Lond., 1868, p. 179, pl. XIV, fig. 6.[1]—SOWERBY, Conch. Icon., XVI, 1868, pl. IV, fig. 9.—*CLESSIN, Conch. Cab. Ano, 1875, p. 204, pl. LXVII, figs. 1, 2.—* FISCHER, Jl. de Conch., XXXVIII, 1890, p. 8.—* P.ETEL, Conch. Sam., III, 1890, p. 186.

**Platiris* (*Mycetopus*) *falcatus* LEA, Syn., 1870, p. 90.

Southeastern Asia.?

(Group of *Solenaia soleniformis.*)

Shell only slightly narrowed in front, the narrow area not distinctly marked off from the rest of the shell.

†SOLENAIA SOLENIFORMIS Benson.

**Anodonta soleniformis* BENSON, Jl. As. Soc. Bengal, V, 1836, p. 749.

**Spatha soleniformis* HANLEY and THEOBALD, Conch. Ind., 1876, p. 5, pl. IX, fig. 1.

**Mycetopus soleniformis* FISCHER, Jl. de Conch., XXXVIII, 1890, p. 94.

**Margaron* (*Unio*) *bensoni* LEA, Syn., 1870, p. 57.

**Mycetopus bensonianus* PÆTEL, Conch. Sam., III, 1890, p. 186.

Assam, India.

†SOLENAIA OLEIVORA Heude.

**Mycetopus oleivorus* HEUDE, Conch. Fluv. Nank., III, 1877, pl. XXII, fig. 46; XXIII, fig. 48.—* FISCHER, Jl. de Conch, XXXVIII, 1890, p. 11.—* PÆTEL, Conch. Sam., III, 1890, p. 187.

* †*Mycetopus recognitus* HEUDE, Conch. Fluv. Nank., III, 1877, pl. XXII, fig. 47.—* FISCHER, Jl. de Conch., XXXVIII, 1890, p. 11.—* PÆTEL, Conch. Sam., III, 1890, p. 187.

**Mycetopus cæruleus* HEUDE, Conch. Fluv. Nank., IX, 1885, pl. LXXI, fig. 135.—* FISCHER, Jl. de Conch., XXXVIII, 1890, p. 11.—* PÆTEL, Conch. Sam., III, 1890, p. 186.

**Mycetopus armatus* HEUDE, Conch. Fluv. Nank., IX, 1885, pl. LXX, fig. 133.[2]

**Mycetopus arcuatus* FISCHER, Jl. de Conch., XXXVIII, 1890, p. 11.—PÆTEL, Conch. Sam., III, 1890, p. 186.

**Mycetopus viridis* HEUDE, Conch. Fluv. Nank., IX, 1885, pl. LXXI, fig. 136.—* FISCHER, Jl. de Conch., XXXVIII, 1890, p. 11.—* PÆTEL, Conch. Sam., III, 1890, p. 187.

**Mycetopus succineus* HEUDE, Conch. Fluv. Nank., IX, 1885, pl. LXX, fig. 184.—* FISCHER, Jl. de Conch., XXXVIII, 1890, p. 11.—* PÆTEL, Conch. Sam., III, 1890, p. 187.

China.

[1] Said to come from forest streams near Chyavetas, Upper Amazon, and to have been discovered by Mr. Bartlett. I can not believe that it is a South American species at all, but rather that it is from southeastern Asia, as it is an almost exact miniature copy of *S. emarginatus* Lea from that region, having its texture, and not the soft, shining appearance of the Mycetopodas. It was described with a miscellaneous lot of shells from various localities, and that given for this is, I think, erroneous.

[2] *M. arcuatus* Heude in explanation of plate.

†SOLENAIA IRIDINEA Heude.

**Mycetopus iridineus* HEUDE, Jl. de Conch., XXII, 1874, p. 117; Conch. Fluv. Nank., I, 1875, pl. VIII, fig. 19.—[b] FISCHER, Jl. de Conch., XXXVIII, 1890, p. 11.—[c] P.ÆTEL, Conch. Sam., III, 1890, p. 187.

**Mycetopus similis* HEUDE, Conch. Fluv. Nank., III, 1877, pl. XXIII, fig. 50.—[b] FISCHER, Jl. de Conch., XXXVIII, 1890, p. 11.—[c] P.ÆTEL, Conch. Sam., III, 1890, p. 187.

China.

SOLENAIA RIVULARIS Heude.

**Mycetopus rivularis* HEUDE, Conch. Fluv. Nank., III, 1877, pl. XXIII, fig. 49.—[b] FISCHER, Jl. de Conch., XXXVIII, 1890, p. 11.

China.

SOLENAIA CARINATA Heude.[1]

**Mycetopus carinatus* HEUDE, Conch. Fluv. Nank., III, 1877, pl. XXI, fig. 45.—[b] FISCHER, Jl. de Conch., XXXVIII, 1890, p. 11.—[c] P.ÆTEL, Conch. Sam., III, 1890, p. 186.

China.

SOLENAIA RUGATA Sowerby.

**Mycetopus rugatus* SOWERBY, Conch. Icon., XVI, 1868, pl. III, fig. 7.—[b] SMITH, Jl. de Conch., XXII, 1874, pl. IV, fig. 1.—[c] CLESSIN, Conch. Cab. Ano., 1876, p. 295, pl. LXVII, fig. 4.—[c] P.ÆTEL, Conch. Sam., III, 1890, p. 187.

**Platiris* (*Mycetopus*) *rugatus* LEA, Syn., 1870, p. 90.

Said to come from Victoria River, Australia. I am a little in doubt about the locality.

(Group of *Solenaia triangularis.*)

Shell short, rounded on post base; very narrow in front.

SOLENAIA TRIANGULARIS Heude.

**Mycetopus triangularis* HEUDE, Conch. Fluv. Nank., IX, 1885, pl. LXXII, fig. 138.—[b] FISHER, Jl. de Conch., XXXVIII, 1890, p. 11.—[c] P.ÆTEL, Conch. Sam., III, 1890, p. 187.

China.

Genus GONIDEA Conrad, 1857.

(Type, *Anodonta randalli* Trask, and *Anodonta feminalis* Gould.)

Gonidea CONRAD, Pr. Ac. Nat. Sci. Phila., I, 1857, p. 165.

Shell elongated, subtriangular, much narrowed in front, wide behind, inflated, subsolid, usually with a high, sharp, posterior ridge; beaks rather sharp but not high, the sculpture consisting of a few, strong, concentric bars; epidermis rayless; hinge with a rudimentary pseudocardinal and lateral in each valve, though these are sometimes wanting; dorsal scars forming a row within the shallow beak cavity; muscle scars irregular; palleal line with a trace of a sinus behind; nacre lurid to purplish.

[1]The type and only known shell is a fossil fragment. It may be a recent species.

Animal with the outer gills larger than the inner behind, narrower in front, inner free from the abdominal sac, all united to the mantle nearly to their posterior points; mantle double edged; branchial opening large, a few irregular, large and small branched papillæ on it; anal opening large, with rudimentary papillæ; superanal opening closed a long way below; foot very large when living. No ova were found in the branchiæ in numerous specimens taken at different dates and localities.

† GONIDEA ANGULATA Lea.

**Anodonta angulata* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 97, pl. XVI, fig. 52; * Obs., II, 1838, p. 97, pl. XVI, fig. 52.—* TROSCHEL, Arch. für Nat., V, 1839, Pt. 2. p. 239.—* HANLEY, Test. Moll., 1842, p. 222; * Biv. Shells, 1843, p. 222, pl. XXIV, fig. 15.—* GOULD, U. S. Expl. Exp., XII, 1852, p. 436.—* CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 263.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 504.—* CHENU, Man., 1859, II, p. 146, fig. 722.—* REEVE, Elem. Conch., II, 1860, pl. XXXI, fig. 180.—CLESSIN, Conch. Cab. Ano., 1874, p. 159, pl. LIII, figs. 3, 4.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 176.

**Margarita* (*Anodonta*) *angulata* LEA, Syn., 1838, p. 32.

**Margaron* (*Anodonta*) *angulata* LEA, Syn., 1852, p. 52; 1870, p. 83.

**Anodon angulata* CALTOW and REEVE, Conch. Nom., 1845, p. 66.

**Anodon angulatus* SOWERBY, Conch. Icon., XVII, 1867, pl. III, fig. 6.

*†*Anodon feminalis* GOULD, Pr. Bost. Soc. N. Hist., III, 1850, p. 293; * Otia Conch., 1862, p. 87.

**Anodonta feminalis* GOULD, U. S. Expl. Exp., XII, 1852, p. 436, figs. 547, 547*a*, 547*b*.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 502.—* PÆTEL, Conch. Sam., III, 1890, p. 179.

**Anodonta randalli* TRASK, Pr. Cal. Ac. N. Sci., I, 1855, p. 29.—* PÆTEL, Conch. Sam., III, 1890, p. 177.

**Anodon biangulata* SOWERBY, Conch. Icon., XVII, 1869, pl. XXIII, figs. 8, 8*a*, 8*b*.

**Anodonta biangulata* CLESSIN, Conch. Cab. Ano., 1876, p. 234, pl. LXXVII, fig. 3.

Central California; north to British Columbia; east to Idaho.

Genus ANODONTOIDES Simpson (in Baker) 1898.

(Type, *Anodonta ferussaciana* Lea.)[1]

Anodontopsis SIMPSON (in Baker), Tr. St. Louis Ac. Sci., VIII, 1898, p. 76; not *Anodontopsis* MCCOY.

Anodontoides SIMPSON (in Baker), Moll. Chicago, 1898, p. 72.

Shell elliptical, inflated, thin, with a faint posterior ridge, sometimes constricted at the center of the base; beaks rather full, with a few coarse, subparallel, concentric ridges, which are curved up rather

[1] The shells of this group are much like those of *Strophitus*, but have different beak sculpture. The character of the marsupia is also different in the two genera. In this group a limited number of ovules was found in the inner gills of one of the few gravid specimens seen, while in *Anodonta* only the outer gills contain ova so far as I have observed. It differs from *Anodonta* in the curving in of the hinge line in front of the beaks, in the beak sculpture, and in having papillæ on the anal opening. Notwithstanding the fact that I have found embryos in all four gills of a specimen of this genus, I have placed it with the Homogenæ rather than with the Tetragenæ because the characters of shell and animal seem to agree better with the former than with the latter.

suddenly behind, and back of these there are fine radiating ridges; epidermis smooth, shining, often rayed; hinge line slightly incurved in front of the beaks, edentulous or bearing the merest rudiments of teeth; muscle scars shallow, irregular; nacre bluish white.

Animal with marsupium occupying the outer and sometimes the four leaves of the branchiæ; ovules more numerous in the outer, the whole pad like; gills large, inner semicircular, free from the abdominal sac, or united to it; branchial opening large, with many small papillæ; anal opening with well-developed papillæ.

†ANODONTOIDES FERUSSACIANUS Lea.

**Anodonta ferussaciana* LEA, Tr. Am. Phil. Soc., V, 1834, p. 45, pl. VI, fig. 15; * Obs., I, 1834, p. 157, pl. VI, p. 15.—* HANLEY, Test. Moll., 1842, p. 218.—* CATLOW and REEVE, Conch. Nom., 1845, p. 66.—CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 264.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 502.—* MUSGROVE, Phot. Conch., 1863, pl. I, fig. 15.—* CLESSIN, Conch. Cab. Ano., 1873, p. 75, pl. XXIII, fig. 4.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 179.

**Anodon ferussaciana* DE KAY, Zool. of N. Y., Pt. 5, 1843, p. 200, pl. XVI, fig. 230.—SOWERBY, Conch. Icon., XVII, 1867, pl. XIV, fig. 51.

**Margarita* (*Anodonta*) *ferussaciana* LEA, Syn., 1836, p. 51; 1838, p. 30.

**Margaron* (*Anodonta*) *ferussaciana* LEA, Syn., 1852, p. 50; 1870, p. 79.

**Anodontoides ferussacianus* BAKER, Moll. Chicago, Pt. 1, 1898, p. 72, pl. III, fig. 6; V, fig. 2.

*† *Anodonta buchanensis* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 47, pl. XIV, fig. 43; * Obs., II, 1838, p. 47, pl. XIV, fig. 43.—* TROSCHEL, Arch. für Nat., V, 1839, Pt. 2, p. 238.—* HANLEY, Test. Moll., 1842, p. 223; Biv. Shells, 1843, p. 223.—* CATLOW and REEVE, Conch. Nom., 1845, p. 66.—* CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 263.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* SOWERBY, Conch. Icon., XVII, 1869, pl. XXIV, fig. 92.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 177.

**Margarita* (*Anodonta*) *buchanensis* LEA, Syn., 1836, p. 54; 1838, p. 32.

**Margaron* (*Anodonta*) *buchanensis* LEA, Syn., 1852, p. 51; 1870, p. 82.

*†*Anodonta argentea* LEA, Pr. Ac. Nat. Sci. Phila., I, 1840, p. 289; * Tr. Am. Phil. Soc., VIII, 1842, p. 223, pl. XIX, fig. 41; * Obs., III, 1842, p. 61, pl. XIX, fig. 41.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 502.—* CLESSIN, Conch. Cab. Ano., 1876, p. 218, pl. LXXII, figs. 3, 4.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 176.

**Margaron* (*Anodonta*) *argentea* LEA, Syn., 1852, p. 50; 1870, p. 79.

**Strophitus argenteus* CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 262.

*†*Anodonta ferruginea* LEA, Pr. Am. Phil. Soc., I, 1840, p. 289; * Tr. Am. Phil. Soc., VIII, 1842, p. 225, pl. XIX, fig. 43; * Obs., III, 1842, p. 63, pl. XIX, fig. 43.—* CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 264.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 502.—* MUSGROVE, Phot. Conch., 1863, pl. I, fig. 2.—* CLESSIN, Conch. Cab. Ano., 1876, p. 219, pl. LXXII, figs. 5, 6.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 179.

**Margaron* (*Anodonta*) *ferruginea* LEA, Syn., 1852, p. 50; 1870, p. 79.

*†*Anodonta plicata* HALDEMAN, Jl. Ac. Nat. Sci. Phila., VIII, 1842, p. 201.—* CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 264.—* B. H. WRIGHT, Check List, 1888.

**Margaron* (*Anodonta*) *plicata* LEA, Syn., 1870, p. 79.

*†*Anodonta denigrata* LEA, Tr. Am. Phil. Soc., X, 1852, p. 285, pl. XXV, fig. 45; * Obs., V, 1852, p. 41, pl. XXV, fig. 45.—* CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 264.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 502.—* CLESSIN,

Conch. Cab. Ano., 1875, p. 210, pl. LXIV, figs. 4, 5.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 178.

**Margaron (Anodonta) denigrata* LEA, Syn., 1852, p. 50; 1870, p. 79.

*†*Anodonta oblita* LEA, Tr. Am. Phil. Soc., X, 1852, p. 290, pl. XXVIII, fig. 52; *Obs., V, 1852, p. 46, pl. XXVIII, fig. 52.—* CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 264.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 502.—* CLESSIN, Conch. Cab. Ano., 1875, p. 165, pl. LIV, figs. 7, 8.—* B. H. WRIGHT, Check List, 1888.

**Margaron (Anodonta) oblita* LEA, Syn., 1852, p. 50; 1870, p. 79.

**Anodon subcylindracea* SOWERBY, Conch. Icon., XVII, 1867, pl. XIV, fig. 47.

**Anodonta subcylindracea* CLESSIN, Conch. Cab. Ano., 1873, p. 92, pl. XXVI, figs. 6, 7.

†ANODONTOIDES FERUSSACIANUS var. SUBCYLINDRACEUS Lea.

**†Anodonta subcylindracea* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 106, pl. XXIV, fig. 117; *Obs., II, 1838, p. 106, pl. XXIV, fig. 117.—* TROSCHEL, Arch. für Nat., V, 1839, Pt. 2, p. 239.—* HANLEY, Test. Moll., 1842, p. 223; * Biv. Shells, 1843, p. 223.—* STIMPSON, Shells of N. Eng., 1851, p. 15.—* CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 264.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* LATCHFORD, Tr. Ottawa F. N. Club, 1882, p. 55.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 185.—* WALTON, Moll. Monroe Co., 1892, p. 17, pl. VIII, fig. 3.

**Margarita (Anodonta) subcylindracea* LEA, Syn., 1838, p. 32.

**Anodon subcylindracea* DE KAY, Zool. of N.Y., Pt. 5, 1843, p. 200, pl. XVI, fig. 229.—* CATLOW and REEVE, Conch. Nom., 1845, p. 68.

**Margaron (Anodonta) subcylindracea* LEA, Syn., 1852, p. 51; 1870, p. 82.

**Anodontoides subcylindraceus* BAKER, Moll. Chicago, Pt. 1, 1898, p. 74, pl. IV, fig. 4; VI, fig. 1.

ANODONTOIDES FERUSSACIANUS var. MODESTUS Lea.

**†Anodonta modesta* LEA, Pr. Ac. Nat. Sci. Phila., 1857, p. 84; *Jl. Ac. Nat. Sci. Phila., IV, 1860, p. 364, pl. LXIII, fig. 189; *Obs., VIII, 1860, p. 46, pl. LXIII, fig. 189.—* CLESSIN, Conch. Cab. Ano., 1874, p. 153, pl. XLIX, figs. 7, 8.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 182.

**Margaron (Anodonta) modesta* LEA, Syn., 1879, p. 79.

**Anodon modestus* SOWERBY, Conch. Icon., XVII, 1867, pl. X, fig. 26.

Mississippi drainage area generally; St. Lawrence River system; Red River of the North; Saskatchewan River; Connecticut.? The varieties are found in the St. Lawrence system.

Genus PEGIAS Simpson, 1900.

(Type, *Margaritana fabula* Lea.)

Shell small, thickened in front, with a sharp posterior ridge, in front of which is a wide radial depression, ending in a basal sinus; above this ridge is another, making the shell decidedly biangulate and truncate behind; beak sculpture consisting of subconcentric corrugations, generally swollen on the posterior ridge; epidermis decorticated, but showing a few dark, radial rays on the base of the shell; pseudocardinals rather solid; laterals wanting. Animal having the marsupium empty in the specimen examined; inner gills larger in front, free from the abdominal sac, all four truncated behind; palpi large; mantle with square spots on its edge; branchial opening with a few large papillæ; anal opening smooth, not separated from the superanal.

† PEGIAS FABULA Lea.

**Margarita* (*Margaritana*) *fabula*, LEA, Syn., 1836, p. 46; 1838, p. 28.
**Margaritana fabula* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 44, pl. XIII, fig. 39; *Obs., II, 1838, p. 44, pl. XIII, fig. 39.—*TROSCHEL, Arch. für Nat., V, 1839, Pt. 2, p. 238.—*KUSTER, Conch. Cab. Unio, 1862, p. 301, pl. C, fig. 3.—*B. H. WRIGHT, Check List, 1888.—*P.ETEL, Conch. Sam., III, 1890, p. 173.
**Unio fabula* HANLEY, Test. Moll., 1842, p. 213; Biv. Shells, 1843, p. 213, pl. XXII, fig. 45.—*CATLOW and REEVE, Conch. Nom., 1845, p. 59.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXXVI, fig. 394.
**Margaron* (*Margaritana*) *fabula* LEA, Syn., 1852, p. 44; 1870, p. 70.
**Micromya fabula* AGASSIZ, Arch. für Nat., I, 1852, p. 47.
**Strophitus fabula* CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 263.
**Baphia fabula* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 499.
* †*Margaritana curreyana* LEA, Pr. Ac. Nat. Sci. Phila., I, 1840, p. 288; *Tr. Am. Phil. Soc., VIII, 1842, p. 223, pl. XVIII, fig. 40; *Obs., III, 1842, p. 61, pl. XVIII, fig. 40.—*KUSTER, Conch. Cab. Unio, 1862, p. 300, pl. C, fig. 2.—*B. H. WRIGHT, Check List, 1888.
**Micromya curreyana* AGASSIZ, Arch. für Nat. I, 1852, p. 47.
**Margaron* (*Margaritana*) *curreyana* LEA, Syn., 1852, p. 42; 1870, p. 68.
**Strophitus curreyana* CONRAD, Pr. Ac. N. Sci., Phila., VI, 1853, p. 263.
**Baphia curreyana* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 499.
**Unio curreyana* SOWERBY, Conch. Icon., XVI, 1868, pl. LXIII, fig. 319.
**Unio curreyanus* HANLEY, Biv. Shells, 1856, p. 386, pl. XXIV, fig. 10.
**Margaritana correyana* P.ETEL, Conch. Sam., III, 1890, p. 173.

Cumberland and Tennessee river systems.

Genus ARCIDENS Simpson, 1900.

(Type, *Alasmodonta confragosa* Say.)

Shell subsolid, inflated, subrhomboid, with full, high beaks; beak sculpture very strong, consisting of irregular corrugations which fall into two loops, at the bases of which the ridges are swollen into knobs that continue out in two radiating rows on to the disk of the shell; in front of and behind the beaks are many fine, radial wrinkles, the posterior ones being zigzagged; surface of the shell covered with oblique folds and wrinkles; epidermis dark olive, shining; there are two elongated, compressed psuedocardinals in the left valve, the posterior under the beak, and curved upward, cutting off the hinge plate in the right valve, which has a single, compressed pseudocardinal in front; laterals numerous, short, blurred; muscle scars irregular; nacre white. Animal with the gills very large, rounded below; inner the larger, free from the abdominal sac; marsupium filling the outer gills, of a peculiar, granular texture; palpi very large, elongated, attached half way to the mantle; mantle with a thick, unspotted border; branchial opening large, papillose; anal opening with rudimentary papillæ.[1]

[1] In the only gravid specimen I have seen the marsupium presented a peculiar, striated, granular structure, different from that of any Naiad I know. It was narrowed in the middle, and produced into a sort of lobe behind, but, though the specimen seemed to be a perfectly normal one, I am in doubt whether this peculiar form is constant. I do not think that this granulation is the result of a diseased condition, though it may be.

†ARCIDENS CONFRAGOSUS Say.

**Alasmodonta confragosa* SAY, N. Harm. Diss., II, 1829, p. 339; * Am. Conch., I, 1830, pl. XXI; IV, 1832 (cover p. 4).—* CONRAD, New F. W. Shells, 1834, p. 72.—* FERUSSAC, Guer. Mag., 1835, p. 26.—* CHENU, Bib. Conch., 1st ser., III, 1845, p. 30, pl. VIII, figs. 1, 1*a*.—* CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 262.

**Margarita* (*Margaritana*) *confragosa* LEA, Syn., 1836, p. 43; 1838, p. 27.

**Unio confragosa* DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 552; 3d ed., II, 1837, p. 674.—* HANLEY, Test. Moll., 1842, p. 210; * Biv. Shells, 1843, p. 210, pl. XXIII, fig. 52.—* DESHAYES, Tr. Elem., 1853, p. 217, pl. XXX, figs. 5-7.

**Baphia confragosa* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 500.

**Margaron* (*Margaritana*) *confragosa* LEA, Syn., 1852, p. 42; 1870, p. 67.

**Margaritana confragosa* CALKINS, Pr. Ottawa Acad., 1874, p. 46.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 172.

**Unio confragosus* CATLOW and REEVE, Conch. Nom., 1845, p. 57.—* SOWERBY, Conch. Icon., XVI, 1867, pl. LX, fig. 299.

Mississippi River and States adjoining it; Ohio River drainage; southwest to the Colorado River, Texas. A specimen is in the Lea collection, said to be from Enterprise, southeastern Alabama, but I am doubtful about the locality.

Genus SYMPHYNOTA Lea, 1829.

(Type, *Symphynota compressa* LEA.)

Symphynota LEA, Tr. Am. Phil. Soc., III, 1829, p. 424.
? *Megadomus* SWAINSON, Tr. on Mal., 1840, p. 266.
? *Complanaria* SWAINSON, Tr. on Mal., 1840, p. 290.

Shell elliptic rhomboid, compressed; beaks low, their sculpture consisting of strong bars; one pseudocardinal in the right valve and two in the left, the hinder somewhat Λ-shaped, cutting off the hinge plate in the right valve; laterals generally imperfect.

Animal with the gills semicircular below, inner the larger, free nearly the whole length from the abdominal sac; marsupium thick, padlike, filling the outer gills; mantle strongly attached at palleal line; branchial opening papillose: anal opening without papillæ.

Subgenus SYMPHYNOTA Lea, 1829.

Shell smooth, subsolid, shining, rayed; teeth delicate; laterals compressed, moderately developed.

SYMPHYNOTA COMPRESSA Lea.

* *Symphynota compressa* LEA, Tr. Am. Phil. Soc., 1829, p. 450, pl. XII, fig. 22; * Obs., I, 1834, p. 64, pl. XII, fig. 22.—* FERUSSAC, Guer. Mag, 1835, p. 25.

* *Complanaria compressa* CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 261.

* *Microcondylaea compressa* PÆTEL, Conch. Sam., III, 1890, p. 175.

* *Unio compressus* CONRAD, New F. W. Shells, 1834, p. 68; * Monog., VIII, 1837, p. 71, pl. XL, fig. 1.—* C. B. ADAMS, Thompson's Hist. Vt., 1842, p. 166.—* HANLEY, Test. Moll., 1842, p. 174; * Biv. Shells, 1843, p. 174, pl. XX, fig. 39.—* DE KAY, Zool. of N. Y., Pt. 5, 1843, p. 191, pl. XXI, fig. 245.—* CATLOW and REEVE, Conch. Nom., 1845, p. 57.—* KUSTER, Conch. Cab. Unio, 1861, p. 198, pl. LXIV, figs. 3, 4.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXI, fig. 303.

* *Margarita* (*Unio*) *compressus* LEA, Syn., 1836, p. 11; 1838, p. 13.
* *Complanaria compressus* AGASSIZ, Arch. für. Nat., I, 1852, p. 48.
* *Complanaria alasmodontina* STIMPSON, Shells of N. Eng., 1851, p. 14.
* *Unio alasmodontinus* PÆTEL, Conch. Sam., III, 1890, p. 144.
* *Margaron* (*Unio*) *pressus* LEA, Syn., 1852, p. 19; 1870, p. 29.[1]
* *Unio pressus* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 498.—* LATCHFORD, Tr. Ottawa F. N. Club., 1882, p. 52.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 164.
* *Alasmodonta pressa* BAKER, Tr. Ac. N. Sci. St. L., VIII, 1898, p. 76, fig.; * Moll. Chicago, Pt. 1, 1898, p. 58, pl. VI, fig. 3; X, fig. 4.

SYMPHYNOTA COMPRESSA var. PLEBIUS C. B. Adams

* *Unio compressus* var. *plebius* C. B. ADAMS, F. W. and L. Shells of Vt., p. 16.

Ohio and St. Lawrence drainage areas; west to Arkansas, north through Nebraska to Wisconsin; Hudson River.

†SYMPHYNOTA CHARLOTTENSIS Lea.

* *Unio charlottensis* LEA, Pr. Ac. N. Sci. Phila., VII, 1863, p. 191; * Jl. Ac. N. Sci. Phila., VI, 1866, p. 8, pl. II, fig. 5; * Obs., XI, 1867, p. 12, pl. II, fig. 5.—* B. H. WRIGHT, Check List, 1888.
* *Margaron* (*Unio*) *charlottensis* LEA, Syn., 1870, p. 51.

Near Charlotte, North Carolina.

†SYMPHYNOTA VIRIDIS Conrad.

* *Unio viridis* CONRAD, Monog., IV, 1836, p. 35, pl. XVII, fig. 1;[2] * Pr. Ac. N. Sci. Phila., VI, 1853, p. 259.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XLV, fig. 214.—* B. H. WRIGHT, Check List, 1888.
* *Margarita* (*Unio*) *tappanianus* LEA, Syn., 1836, p. 39; 1838, p. 25.
* *Unio tappanianus* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 62, pl. XVII, fig. 55; *Obs. II, 1838, p. 62, pl. XVII, fig. 55.—* TROSCHEL, Arch. für Nat., V, 1839, Pt. 2, p. 236.—* HANLEY, Test. Moll., 1842, p. 209; Biv. Shells, 1843, p. 209, pl. XXI, fig. 38.—* DE KAY, Zool. of N. Y., Pt. 5, 1843, p. 194, pl. XX, fig. 242.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—* CHENU, Ill. Conch., 1858, pl. XX, figs. 2, 2*a*, 2*b*.—* KUSTER, Conch. Cab. Unio, 1862, p. 270, pl. XCI, fig. 3.—* HARTMAN and MICHENER, Conch. Test., 1874, p. 89, fig. 185.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 169.
* *Margaron* (*Unio*) *tappianus* LEA, Syn., 1852, p. 39; 1870, p. 62.
* *Unio tappianus* CATLOW and REEVE, Conch. Nom., 1845, p. 64.
* †*Unio hyalinus* LEA, Pr. Am. Phil. Soc., IV, 1845, p. 164; * Tr. Am. Phil. Soc., X, 1848, p. 69, pl. II, fig. 4; Obs., IV, 1848, p. 43, pl. II, fig. 4.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 250.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—* KUSTER, Conch. Cab. Unio, 1861, p. 204, pl. LXVIII, fig. 3.—* PÆTEL, Conch. Sam., III, 1890, p. 155.
* *Margaron* (*Unio*) *hyalinus* LEA, Syn., 1852, p. 39; 1870, p. 62.

[1] Lea changed his name *compressa* to *pressus* because the former had been used for a *Unio* previously by Sowerby. The restoration of the genus *Symphynota* makes the earlier name of Lea valid.

[2] Credited by Conrad and others to Rafinesque. The description of the latter of *Unio viridis* is not sufficiently clear to distinguish it from some of the other members of this genus, and the locality given is in error for the shell figured by Conrad, which belongs exclusively to the Atlantic drainage, and not to the Ohio River and Kentucky, localities given by Rafinesque.

*†*Unio pertennis* LEA, Pr. Ac. N. Sci. Phila., VII, 1863, p. 193; *Jl. Ac. N. Sci. Phila., VI, 1866, p. 8, pl. II, fig. 4; *Obs., XI, 1867, p. 12, pl. II, fig. 4.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *pertennis* LEA, Syn., 1870, p. 62.

Streams draining into the Atlantic from New York south to North Carolina; Monroe County, Michigan?

†SYMPHYNOTA DECORATA Lea.

**Unio decoratus* LEA, Tr. Am. Phil. Soc., X, 1852, p. 257, pl. XIII, fig. 6; *Obs., V, 1852, p. 13, pl. XIII, fig. 6.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 248.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 498.—*SOWERBY, Conch. Icon., XVI, 1868, pl. XCI, fig. 496.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 150.

**Margaron* (*Unio*) *decoratus* LEA, Syn., 1852, p. 19; 1870, p. 29.

*†*Unio insolidus* LEA, Pr. Ac. N. Sci. Phila., II, 1872, p. 159; *Jl. Ac. N. Sci. Phila., VIII, 1874, p. 40, pl. XIII, fig. 37; *Obs., XIII, 1874, p. 44, pl. XIII, fig. 37.—*B. H. WRIGHT, Check List, 1888.

Virginia to South Carolina.

†SYMPHYNOTA NEGLECTA Lea.

Unio neglectus LEA, Desc. 12 Uniones, 1843; *Tr. Am. Phil. Soc., IX, 1846, p. 280, pl. XLII, fig. 10; *Obs., IV, 1848, p. 88, pl. XLII, fig. 10.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 252.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—*KUSTER, Conch. Cab. Unio, 1861, p. 225, pl. LXXVI, fig. 4.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 160.

**Margaron* (*Unio*) *neglectus* LEA, Syn., 1852, p. 33; 1870, p. 54.

Northern Alabama.

†SYMPHYNOTA QUADRATA Lea.

**Margaritana quadrata* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 41; *Jl. Ac. N. Sci. Phila., II, 1862, p. 210, pl. XXXII, fig. 279; *Obs., IX, 1863, p. 32, pl. XXXII, fig. 279.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 173.

**Margaron* (*Margaritana*) *quadrata* LEA, Syn., 1870, p. 68.

**Margaritana* (*Alasmodonta*) *quadrata* CLESSIN, Conch. Cab. Ano., 1876, p. 273, pl. LXXXIII, figs. 5, 6.

Eastern Tennessee.

Subgenus LASMIGONA Rafinesque, 1831.

(Type, *Alasmidonta costata* Rafinesque.)[1]

Shell subrhomboid, compressed, corrugated behind; beaks low, their sculpture consisting of several coarse ridges which generally fall into two slight loops, and often with radiating ridges in front and behind; epidermis shining; laterals partly developed, consisting of blurred ridges which slope diagonally downward and backward on the hinge plate; cavities of the beaks shallow; dorsal scars faint, irregular.

[1] The description of *Alasmidonta costata* of Rafinesque so clearly covers the species described three years later as *Alasmodonta rugosa* by Barnes that the former name must be used.

Animal with the marsupium occupying the whole of the outer gills, very thick, like that of *Anodonta;* inner gills free all or the greater part of their length from the abdominal sac; branchial opening papillose; anal opening generally smooth or only slightly crenulate.

†SYMPHYNOTA COSTATA Rafinesque.

**Alasmidonta costata* RAFINESQUE, Ann. Gen. Sci. Brux., V, 1820, p. 313, pl. LXXXII, figs. 15, 16.

**Alasmodonta costata* SAY, Am. Conch., VI, 1834.—* CONRAD, New F. W. Shells, 1834, p. 72.—* FERUSSAC, Guer. Mag., 1835, p. 25

**Complanaria costata* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 261.

**Alasmodonta rugosa* BARNES, Am. Jl. Sci., VI, 1823, p. 278, pl. XIII, fig. 21.—SHORT and EATON, Transylvania Jl., 1831, p. 81.—* C. B. ADAMS, Thompson's Hist. of Vt., 1842, p. 165.—* BAKER, Moll. Chicago, Pt. 1, 1898, p. 57, pl. VII, figs. 1, 2; VIII, figs. 3, 4.

**Mya rugosa* EATON, Zool. Text-Book, 1826, p. 222.

**Margarita* (*Margaritana*) *rugosa* LEA, Syn., 1836, p. 44; 1838, p. 27.

**Unio rugosa* HANLEY, Test. Moll., 1842, p. 211; * Biv. Shells, 1843, p. 211, pl. XXI, fig. 8.

**Alasmodon rugosa* DE KAY, Zool. N. Y., Pt. 5, 1843, p. 196, pl. XIV, fig. 226.

**Complanaria rugosa* STIMPSON, Shells of N. Eng., 1851, p. 14.

Margaron (*Margaritana*) *rugosa* LEA, Syn., 1852, p. 42; 1870, p. 67.

* *Baphia rugosa* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 500.

* *Margaritana rugosa* CALKINS, Pr. Ottawa Ac. Sci., 1874, p. 46.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 164.

* *Lasmigona rugosum* RAFINESQUE, Cont. Mon., Og., 1831, p. 5.

* *Unio rugosus* CATLOW and REEVE, Conch. Nom., 1845, p. 63.—KUSTER, Conch. Cab. Unio, 1861, p. 200, pl. LXVI, figs. 1-3.—SOWERBY, Conch. Icon., XVI, 1867, pl. LX, fig. 302.

**Alasmodonta hians* FERUSSAC, Guer. Mag., 1835, p. 25.

Mississippi drainage generally; St. Lawrence basin; Manitoba; Hudson River?; Columbus, Mississippi. Texas?.

Subgenus PTEROSYGNA Rafinesque, 1831.

(Type, *Alasmodonta complanata* Barnes.)

Shell large, ovate-rhomboid, inflated in post basal region; beaks much compressed, their sculpture sharply and strongly doubly looped; epidermis dark, scarcely rayed; teeth very heavy.

Animal with an extremely thick marsupium; palpi large; mantle with small crenulations on lower border; branchial opening large; anal opening small, both slightly papillose.

†SYMPHYNOTA COMPLANATA Barnes.

* *Alasmodonta complanata* BARNES, Am. Jl. Sci., VI, 1823, p. 278, pl. XIII, fig. 21.—* HILDRETH, Am. Jl. Sci., XIV, 1828, p. 289.—* CONRAD, New F. W. Shells, 1834, p. 72.—* SAY, Am. Conch., VI, 1834.—* BAKER, Moll. Chicago, Pt. 1, 1898, p. 60, pl. VIII, figs. 1, 2; IX, figs. 1-4.

**Mya complanata* EATON, Zool. Text-Book, 1826, p. 222.

**Symphynota complanata* LEA, Tr. Am. Phil. Soc., III, 1830, p. 448.—* SHORT and EATON, Transylvania Jl., 1831, p. 80.—* LEA, Obs., I, 1834, p. 62.—FERUSSAC, Guer. Mag., 1835, p. 25.

**Margarita* (*Margaritana*) *complanata* LEA, Syn., 1836, p. 43; 1838, p. 26.
**Unio complanata* HANLEY, Test. Moll., 1842, p. 210; * Biv. Shells, 1843, p. 210, pl. XXI, fig. 9.
**Complanaria complanata* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 261.
**Baphia complanata* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 500.
**Margaritina complanata* CALKINS, Pr. Ottawa Acad., 1874, p. 46.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 172.
**Alasmodon complanatus* SOWERBY, Conch. Man., 1842, p. 61, fig. 140.—* CATLOW and REEVE, Conch. Nom., 1845, p. 57.—* KUSTER, Conch. Cab. Unio, 1861, p. 199, pl. LXV, fig. 1.—* SOWERBY, Conch. Icon., XVI, 1866, pl. L, fig. 266.
Complanaria gigas SOWERBY, Conch. Man., 1839, fig. 141, *; 1842, p. 115, fig. 141.
*? *Megadomus gigas* SWAINSON, Tr. on Mal., 1840, pp. 265, 378.

† SYMPHYNOTA COMPLANATA var. KATHERINÆ Lea.

Unio katherinæ LEA, Syn., 1838, p. 35;[1] Tr. Am. Phil. Soc., VI, 1839, p. 143.—* TROSCHEL, Arch. für Nat., V, 1839, II, p. 237.

Upper Mississippi drainage, as far south as Arkansas on the west; Ohio River system; upper St. Lawrence and its tributaries; north into the Mackenzie River.

Genus ALASMIDONTA Say, 1818.

(Type, *Monodonta undulata* Say.)[2]

Monodonta SAY, Nich. Enc., II, 1816.
Alasmidonta SAY, Jl. Ac. N. Sci. Phila., I, 1818, p. 459.
Alasmodonta SAY, Nich. Enc., 3d ed., IV, 1819.
Alasmodon SWAINSON, Tr. on Mal., 1840, p. 382.
Uniopsis SWAINSON, Tr. on Mal., 1840, p. 382.

Shell generally rhomboid, inflated, with a well-developed posterior ridge, which ends in a point behind when it is single or a biangulation when double; beaks full and high, with coarse, concentric or slightly doubly-looped bars; epidermis rayed, shining; hinge with two pseudocardinals in the left valve and one in the right; laterals wanting or imperfect; cavity of the beaks deep; dorsal scars under the hinge plate; nacre bluish.

Animal with the marsupium occupying the entire outer gills; gills rounded below, inner much the larger, united to the abdominal sac, or free; mantle generally having square spots on the posterior border; branchial opening papillose; anal opening smooth or crenulate.

Subgenus ALASMIDONTA Say, 1818.

(Type, *Monodonta undulata* Say.)

Shell ovate-rhomboid, solid, inflated, shining, with very strong, generally concentric beak sculpture; pseudocardinals solid, stumpy, some

[1] This is probably the small, peculiar boreal form of this species, which appears very different from the type.

[2] Changed by Say afterwards to *Alasmidonta undulata* as the name *Monodonta* was preoccupied. For some reason Say later on called his genus *Alasmodonta*.

what radiately ridged; laterals short, very imperfect, or wanting; beak cavities deep, compressed.

Animal with inner gills wider than the outer throughout; palpi long; marsupium loose and flabby, and having ova scattered throughout it in the only gravid specimen seen.

† ALASMIDONTA UNDULATA Say.

Monodonta undulata SAY, Nich. Enc., 1816, pl. III, fig. 3.
* *Alasmidonta undulata* SAY, Jl. Acad. N. Sci. Phila., I, 1818, p. 460.
* *Alasmodonta undulata* SAY, Nich. Enc., IV, 1819, pl. III, fig. 3.—* CONRAD, New F. W. Shells, 1834, p. 73.—* FERUSSAC, Guer. Mag., 1835, p. 26.—* C. B. ADAMS, F. W. and L. S. of Vt., 1842, p. 15.
* *Alasmodon undulata* SWAINSON, Tr. on Mal., 1840, p. 288, fig. 61.—* GOULD, Inv. Mass., 1841, p. 115, fig. 76.—* DE KAY, Zool. of N. Y., Pt. 5, 1843, p. 198, pl. XV, fig. 227.
* *Margarita* (*Margaritana*) *undulata* LEA, Syn., 1836, p. 44; 1838, p. 27.
* *Unio undulata* HANLEY, Test. Moll., 1842, p. 211.—* Biv. Shells, 1843, p. 211.
* *Margaritana undulata* KUSTER, Conch. Cab. Unio, 1862, p. 298, pl. XCIX, fig. 4.—* GOULD, Inv. Mass., 1870, p. 176, fig. 478.—* HARTMAN and MICHENER, Conch. Cest., 1874, p. 92, fig. 190.—* LATCHFORD, Tr. Ottawa F. N. Cl., 1882, p. 54.—* H. CARPENTER, Naut., IV, 1890, p. 47.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 174.
* *Margaron* (*Margaritana*) *undulata* LEA, Syn., 1852, p. 42; 1870, p. 68.
* *Mya undulata* WOOD, Ind. Test. Rev., 1856, p. 199, pl. I, supp., fig. 5.
* *Raphia undulata* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 499.
* *Unio undulatus* CATLOW and REEVE, Conch. Nom., 1845, p. 65.
* *Strophitus undulatus* STIMPSON, Shells of New Eng., 1851, p. 15.
* ? *Unio glabratus* SOWERBY, Rec. and Foss. Shells, XVI, 1823, fig.
Alasmodonta sculptilis SAY, N. Harmony Diss., II, 1829, p. 339.—FERUSSAC, Guer. Mag., 1835, p. 26.—L. W. SAY, Terr. and Fluv. Shells, 1840, p. 9.
* *Strophitus sculptilis* STIMPSON, Shells of New Eng., 1851, p. 15.
* *Unio hians* VALENCIENNES Rec. Obs. Zool., II, 1833, p. 235, pl. LIV, figs. 2*a*, 2*b*.
* *Uniopsis radiata* SWAINSON, Tr. on Mal., 1840, p. 289, fig. 62.
* *Uniopsis mytiloides* SWAINSON, Tr. on Mal., 1840, p. 382, fig. 62.
* ? *Unio swainsoni* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXV[1], fig. 396.
* *Margaron* (*Margaritana*) *swainsoni* LEA, Syn., 1870, p. 30.

Lower St. Lawrence drainage; southward to North Carolina.

Subgenus PRESSODON A Simpson, 1900.

(Type, *Unio calceolus* Lea.[1])

Shell decidedly rhomboid, surface generally painted with unbroken rays; beak sculpture slightly corrugated; teeth compressed.

Animal with a thick, smooth, pad like marsupium.

(Group of *Alasmidonta calceola*.)

Shell small, subsolid, rhomboid, inflated, rayed but not shining; beak sculpture varying from strong concentric bars to irregular corrugations, sometimes faintly doubly looped, and with fine radiating

[1] The names *Hemiodon*, *Hemiodonta*, and *Hemidon* were applied by Swainson to this group, but he used the first name previously for a division of the Helicidæ. It is better to apply a new name.

ridges in front and behind; pseudocardinals rather solid; laterals very faint; marsupium occupying the whole of the outer gills, thick, pad-like; inner gills wholly or partly free from the abdominal sac; mantle bordered with square, black spots.

†ALASMIDONTA CALCEOLA Lea.

**Unio calceolus* LEA, Tr. Am. Phil. Soc., III, 1830, p. 265, pl. III, fig. 1; *Obs., I, 1834, p. 7, pl. III, fig. 1.—* FERUSSAC, Guer. Mag., 1835, p. 26.—* CHENU, Ill. Conch., 1858, pl. VIII, figs. 2, 2*a*, 2*c*.—* KUSTER, Conch. Cab. Unio, 1861, p. 187, pl. LIX, fig. 3.

**Strophitus calceolus* CONRAD, Pr. Ac. N. Sci., Phila., VI, 1853, p. 262.

**Unio calceola* DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 546; 3d ed., II, 1839, p. 672.—* HANLEY, Test. Moll., 1842, p. 212; *Biv. Shells, 1843, p. 212, pl. XXII, fig. 29.—* CATLOW and REEVE, Conch. Nom., 1845, p. 56.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXVIII, fig. 410.

**Margarita* (*Margaritana*) *calceola* LEA, Syn., 1836, p. 45; 1838, p. 27.

**Margaron* (*Margaritana*) *calceola* LEA, Syn., 1852, p. 43; 1870, p. 68.

**Margaritana calceola* KUSTER, Conch. Cab. Unio, 1862, p. 299, pl. XCIX, fig. 6.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 172.

**Baphia calceola* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 500.

**Alasmodonta truncata* CONRAD, New F. W. Shells, 1834, p. 73.

**Margarita* (*Margaritana*) *deltoidea* LEA, Syn., 1836, p. 44; 1838, p. 27.

**Margaritana deltoidea* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 43, pl. XIII; fig. 38; Obs., II, 1838, p. 43, pl. XIII, fig. 38.—* TROSCHEL, Arch. für Nat., V, 1839, II, p. 238.—* CHENU, Man., 1859, II, p. 144, fig. 711.—* KUSTER, Conch. Cab., 1862, p. 299, pl. XCIX, fig. 5.—* CALKINS, Pr. Ottawa Ac. Sci., 1874, p. 46.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 173.

**Unio deltoidea* HANLEY, Test. Moll., 1842, p. 211; *Biv. Shells, 1843, p. 211, pl. XXII, fig. 50.

**Margaron* (*Margaritana*) *deltoidea* LEA, Syn., 1852, p. 42, 1870, p. 67.

**Strophitus deltoidea* CONRAD, Pr. Ac. N. Sci., Phila., VI, 1853, p. 263.

**Baphia deltoidea* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 499.

**Alasmodonta deltoidea* BAKER, Moll. Chicago, Pt. 1, 1898, p. 63, pl. VI, fig. 2; VII, fig. 4.

**Unio deltoideus* CATLOW and REEVE, Conch. Nom., 1845, p. 58.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXVI, fig. 395.

Upper Mississippi drainage; Ohio, Cumberland, and Tennessee rivers; Lower and Middle St. Lawrence systems.

†ALASMIDONTA MINOR Lea.

**Margaritana minor* LEA, Pr. Am. Phil. Soc., IV, 1845, p. 166; Tr. Am. Phil. Soc., X, 1848, p. 82, pl. VIII, fig. 26; *Obs., IV, 1848, p. 56, pl. VIII, fig. 26.—* CHENU, Man., 1859, II, p. 144, fig. 713.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 173.

**Strophitus minor* CONRAD, Pr. Ac. N. Sci., Phila., VI, 1853, p. 263.

**Margaron* (*Margaritana*) *minor* LEA, Syn., 1852, p. 42; 1870, p. 67.

**Baphia minor* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 499.

Tennessee and Cumberland river systems.

(Group of *Alasmidonta heterodon*.)

Shell small, rather thin, rhomboid; beak sculpture very strong, consisting of concentric ridges or irregular corrugations, often slightly

doubly looped and swollen on the well-developed posterior ridge; surface rayed; pseudocardinals compressed, reflexed; laterals single, double, or triple in each valve.

Animal with branchial opening having a few coarse papillæ; anal opening smooth, or with very fine crenulations.

†ALASMIDONTA HETERODON Lea.

**Unio heterodon* LEA, Tr. Am. Phil. Soc., III, 1830, p. 428, pl. VIII, fig. 11; *Obs., I, 1834, p. 42, pl. VIII, fig. 11.—* CONRAD, New F. W. Shells, 1834, p. 69.—* FERUSSAC, Guer. Mag., 1835, p. 26.—* DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 548; 3d ed., II, 1839, p. 672.—* CONRAD, Monog., X, 1838, p. 90, pl. XLIX, fig. 3.—* HANLEY, Test. Moll., 1842, p. 183; Biv. Shells, 1843, p. 183, pl. XXI, fig. 42.—* CATLOW and REEVE, Conch. Nom., 1845, p. 59.—* CONRAD, Pr. Ac. N. Sci., Phila., VI, 1853, p. 250.—* CHENU, Ill. Conch., 1858, pl. XVI, figs. 2, 2*a*, 2*b*.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* KUSTER, Conch. Cab., 1861, p. 192, pl. LXI, fig. 2.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXV, fig. 184.—* HARTMAN and MICHENER, Conch. Cest., 1871, p. 91, fig. 188.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 155.

**Margarita* (*Unio*) *heterodon* LEA, Syn., 1836, p. 18; 1838, p. 16.

**Margaron* (*Unio*) *heterodon* LEA, Syn., 1852, p. 24; 1870, p. 36.

Northern New England to Virginia.

ALASMIDONTA DIVERSA Conrad.

**Unio diversus* CONRAD, Am. Jl. Sci., XXI, 1856, p. 172 (fig. in outline).—B. H. WRIGHT, Check List, 1888.[1]

Alabama.

(Group of *Alasmidonta collina*.)

Shell rhomboid, subsolid, with beak sculpture consisting of strong, concentric bars, sometimes slightly doubly looped and swollen on the low, posterior ridge; often with one or more small spines on the disk in front of the posterior ridge; epidermis brown, rayless or feebly rayed; rest marks well defined; teeth rather compressed; laterals lamellar.

Animal unknown.

†ALASMIDONTA COLLINA Conrad.

**Unio collinus* CONRAD, Monog., VIII, 1837, p. 65, pl. XXXVI, fig. 2; XII, 1840, p. 109, pl. LX, fig. 3.—* TROSCHEL, Arch. für Nat., IV, 1838, p. 287.—* CONRAD, Pr. Ac. N. Sci., Phila., VI, 1853, p. 247.—* HANLEY, Biv. Shells, 1856, p. 382, pl. XX, fig. 57.—* KUSTER, Conch. Cab. Unio, 1861, p. 188, pl. LIX, fig. 5.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XLIX, fig. 263.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 148.

**Margaron* (*Unio*) *collinus* LEA, Syn., 1852, p. 23; 1870, p. 35.

North Carolina and Virginia.

[1] Conrad says this has a remarkable resemblance to *Unio heterodon*, but is shorter.

(Group of *Alasmidonta holstonia.*)

Shell subsolid, beak sculpture rather strong, decidedly doubly looped, surface brownish, slightly rayed; pseudocardinals delicate; laterals nearly or quite wanting. Animal like that of *A. calceola.*

†ALASMIDONTA HOLSTONIA Lea.

* *Margaritana holstonia* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 42, pl. XIII, fig. 37; *Obs., II, 1838, p. 42, pl. XIII, fig. 37.—* TROSCHEL, Arch. für Nat., V, 1839, Pt. 2, p. 238.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 173.

* *Margarita* (*Margaritana*) *holstonia* LEA, Syn., 1836, p. 46; 1838, p. 28.

* *Margaron* (*Margaritana*) *holstonia* LEA, Syn., 1852, p. 44; 1870, p. 70.

* *Strophitus holstonia* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 263.

* *Baphia holstonia* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 499.

* *Unio holstonianus* HANLEY, Biv. Shells, 1843, p. 213, pl. XXII, fig. 44.—* CATLOW and REEVE, Conch. Nom., 1845, p. 60.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXVI, fig. 398.

* *Margaritana holstoniana* KUSTER, Conch. Cab. Unio, 1862, p. 302, pl. C, fig. 4.

* ? *Unio striatus* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXVIII, fig. 407.

Tennessee River system; headwaters of the Coosa River.

†ALASMIDONTA GEORGIANA Lea.[1]

* *Margaritana etowahensis* LEA, Pr. Ac. Nat. Sci. Phila., II, 1858, p. 138; * Jl. Ac. Nat. Sci. Phila., IV, 1859, p. 227, pl. XXXI, fig. 110; * Obs., VII, 1859, p. 45, pl. XXXI, fig. 110.—* B. H. WRIGHT, Check List, 1888.

* *Margaritana* (*Alasmodonta*) *etowahensis* CLESSIN, Conch. Cab. Ano., 1875, p. 270, pl. LXXXI, figs. 1, 2.

* *Margaritana etowahensis* PÆTEL, Conch. Sam., III, 1890, p. 173.

* *Margaritana georgiana* LEA, Pr. Ac. Nat. Sci. Phila., III, 1859, p. 280.—B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Margaritana*) *georgiana* LEA, Syn., 1870, p. 68.

* *Alasmodonta impressa* ANTHONY, Am. Jl. Conch., I, 1865, p. 157, pl. XII, fig. 4.

Tennessee; Etowah River, Georgia.

Subgenus RUGIFERA Simpson, 1900.

(Type, *Alasmodonta marginata* Say.)

Shell elongated, rhomboid, inflated, surface brilliantly painted with radiations, which often break into a dappled or splashed pattern of color; posterior slope slightly corrugated; teeth very imperfect; laterals wanting.

Animal with a thick, smooth, pad like marsupium. Mantle with square spots behind.

†ALASMIDONTA MARGINATA Say

* *Alasmodonta marginata* SAY, Nich. Enc., 1819, No. 1; Am. Conch., VI, 1834.—* CONRAD, New F. W. Shells, 1834, p. 72.—* FERUSSAC, Guer. Mag., 1835, p. 25.—* STIMPSON, Shells of N. Eng., 1851, p. 15.—* AGASSIZ, Arch. für Nat., I, 1852, p. 46.—* CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 262.

[1] First called *Margaritana etowahensis* by Dr. Lea, but as that name had previously been used by Conrad its author changed it to *georgiana.*

* *Alasmidonta marginata* RAFINESQUE, An. Gen. Sci. Brux., V, 1820, p. 317.

* *Margarita* (*Margaritana*) *marginata* LEA, Syn., 1836, p. 43; 1838, p. 27.

* *Alasmodon marginata* GOULD, Inv. Mass., 1841, p. 116, fig. 77.—* DE KAY, Zool. of N. Y., Pt. 5, 1843, p. 196, pl. XIV, fig. 225.

* *Unio marginata* HANLEY, Test. Moll., 1842, p. 211; * Biv. Shells, 1843, p. 211, pl. XXI, fig. 23.

* *Anodonta marginata* C. B. ADAMS, Thompson's Hist. Vt., 1842, p. 164; * F. W. and L. S. of Vt., 1842, p. 14.—* STIMPSON, Shells of N. Eng., 1851, p. 15.

* *Margaron* (*Margaritana*) *marginata* LEA, Syn., 1852, p. 42; 1870, p. 67.

* *Baphia marginata* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 500.

* *Margaritana marginata* GOULD, Inv. of Mass., 1870, p. 177, fig. 479.—HARTMAN and MICHENER, Conch. Cest., 1874, p. 93, fig. 191.—* LATCHFORD, Tr. Ottawa F. N. Club, 1882, p. 54.—* B. H. WRIGHT, Check List, 1888.—* H. CARPENTER, Naut., IV, 1890, p. 46.—* PÆTEL, Conch. Sam., III, 1890, p. 173.

* *Unio marginatus* CATLOW and REEVE, Conch. Nom., 1845, p. 61.

* *Unio varicosa* LAMARCK, An. sans Vert., VI, 1819, p. 78.—* DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 543; 3d ed., II, 1839, p. 671.

* *Unio cariosa* LAMARCK, An. sans Vert., VI, 1819, p. 80.

* *Alasmodon corrugata* DE KAY, Zool. of N. Y., Pt. 5, 1843, p. 198, pl. XXIV, fig. 259.

* *Mya rugulosa* WOOD, Ind. Test., 3d ed., 1856, p. 199, pl. I, supp. fig. 7.

Lower St. Lawrence; southward in streams draining into the Atlantic to South Carolina.

† ALASMIDONTA TRUNCATA B. H. Wright.[1]

* *Alasmodonta truncata* CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 262.

* *Margaritana marginata* KUSTER, Conch. Cab. Unio, 1862, p. 297, pl. XCIX, fig. 3.—* CALKINS, Pr. Ottawa Acad., 1874, p. 46.

* *Alasmodonta marginata* BAKER, Moll. Chicago, Pt. 1, 1898, p. 62. pl. IV, fig. 4; VII, fig. 7; XXII, fig. 3.

* *Margaritana marginata* var. *truncata* B. H. WRIGHT, Naut., XI, 1898, p. 124

* *Unio marginatus* SOWERBY, Conch. Icon., XVI, 1866, pl. LI, fig. 267.

Upper Mississippi drainage; Ohio, Cumberland, and Tennessee river systems; Michigan; Upper St. Lawrence drainage.

† ALASMIDONTA RAVENELIANA Lea.

* *Margaritana raveneliana* LEA, Tr. Am. Phil. Soc., V, 1834, p. 106, pl. XVII, fig. 50; * Obs., I, 1834, p. 218, pl. XVII, fig. 50.—* KUSTER, Conch. Cab. Unio, 1862, p. 297, pl. XCIX, fig. 2.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 173.

* *Alasmodonta raveneliana* FERUSSAC, Guer. Mag., 1835, p. 26.

* *Margarita* (*Margaritana*) *raveneliana* LEA, Syn., 1836, p. 44; 1838, p. 27.

* *Margaron* (*Margaritana*) *raveneliana* LEA, Syn., 1852, p. 42; 1870, p. 68.

* *Baphia raveneliana* H. and A. ADAMS, Gen. Rec. Moll, II, 1857, p. 500.

* *Strophitus ravenelianus* CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 263.

* *Unio swananoensis* HANLEY, Test. Moll., 1842, p. 211; Biv. Shells, 1843, p. 211, pl. XXIII, fig. 39.—CATLOW and REEVE, Conch. Nom., 1845, p. 64.

[1] Say's manuscript. I believe this to be specifically different from the smaller, thinner, less inflated, biangulate *A. marginata*. The latter is confined to the Atlantic drainage; the former belongs to the Mississippi Valley, but has migrated into the St. Lawrence basin. No description was published of this form that I know of until that of Mr. Wright appeared.

Tennessee and Cumberland river systems.

Unfigured species.

Margaritana etowahensis CONRAD, Pr. Ac. Nat. Sci. Phila., IV, 1849, p. 154.[1]

Etowah River, Georgia.

Subgenus BULLELLA Simpson, 1900.

(Type, *Margaritana arcula* Lea.)

Shell thin, greatly inflated, somewhat triangular, with a high, sharp posterior ridge; beaks very full, having exceedingly strong, concentric sculpture, extending well on to the disk; pseudocardinals reflexed, compressed.

Animal with the gills large, nearly semicircular below, inner the larger, united the whole length to the abdominal sac; mantle border with square spots.[2]

†ALASMIDONTA ARCULA Lea.

* *Margarita* (*Margaritana*) *arcula* LEA, Syn., 1836, p. 43; 1838, p. 27.
* *Margaritana arcula* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 71, pl. XXII, fig. 69; * Obs., II, 1838, p. 71, pl. XXII, fig. 69.—* TROSCHEL, Arch. für. Nat., V, 1893, Pt. 2, p. 238.—* CHENU, Man., 1859, II, p. 144, fig. 712.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 172
* *Unio arcula* HANLEY, Test. Moll., 1842, p. 210; Biv. Shells, 1843, p. 210, pl. XXII, fig. 49.—* CATLOW and REEVE, Conch. Nom., 1845, p. 56.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XLVIII, fig. 259.
* *Margaron* (*Margaritana*) *arcula* LEA, Syn., 1852, p. 42; 1870, p. 67.
* *Alasmodonta arcula* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 262.
* *Baphia arcula* H. and A. ADAMS, Gen. Rec. Moll, II, 1857, p. 500.
* *Margaritana* (*Alasmodonta*) *arcula* CLESSIN, Conch. Cab. Ano., 1876, p. 272, pl. LXXXIII, figs. 7, 8.

Altamaha River, Georgia.

†ALASMIDONTA TRIANGULATA Lea.

* *Margaritana triangulata* LEA, Pr. Ac. N. Sci. Phila., II, 1858, p. 138; * Jl. Ac. N. Sci. Phila., IV, 1859, p. 228, pl. XXXII, fig. 111; * Obs., VII, 1859, p. 46, pl. XXXII, fig. 111.—* KUSTER, Conch. Cab. Unio, 1862, p. 303, pl. c, fig. 6.—* B. H. WRIGHT, Check List, 1888.
* *Unio triangulata* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXX, fig. 414.
* *Margaron*, (*Margaritana*) *triangulata* LEA, Syn., 1870, p. 68.
* *Margaritana triangulatus* PÆTEL, Conch., Sam., III, 1890, p. 174.

South Carolina and Georgia.

The following species are unknown to me:

* *Alasmodon* (*Decurambis*) *atropurpureum* RAFINESQUE, Cont. Monog., 1831, p. 5.
* *Alasmodon* (*Decurambis*) *scriptum* RAFINESQUE, Cont. Monog., 1831, p. 5.

[1] Allied to *rarenelianus* LEA, according to Conrad.

[2] In the only gravid specimen seen the outer gills were curiously wrinkled and folded longitudinally, though the inner gills were plain. If this were a normal character it would entitle the species to generic rank, but I can not feel certain that it is. *A. triangulata* seems to stand between this and the ordinary Alasmidontas.

[a] *Alasmodon* (*Lasmigona*) *viridis* RAFINESQUE, Cont. Monog., 1831, p. 5.
[b] *Alasmodon* (*Sulcataria*) *papyraceum* RAFINESQUE, Cont. Monog., 1831, p. 5.
[c] *Alasmodon* (*Sulcataria*) *badium* RAFINESQUE, Cont. Monog., 1831, p. 5.
[d] *Alasmodon* (*Amblamodon*) *hiatus* RAFINESQUE, Cont. Monog., 1831, p. 5.
[e] *Margaritana columbensis* LEA,[1] Pr. Ac. N. Sci. Phila., XI, 1867, p. 81.

Genus HEMILASTENA (Agassiz, 1852) Simpson.

(Type, *Alasmodonta ambigua* Say.)[2]

Shell small, elongate elliptical, rounded in front and behind, often slightly incurved at the central base; beaks rather sharp, but not full; sculpture consisting of fine, parallel ridges which are looped up in the middle, and open behind; epidermis brownish, rayless; teeth imperfect, a single irregular, compressed tooth in each valve; that of the left under the beak, that of the right in front of it; laterals nearly or quite wanting; anterior end of the shell much thickened; anterior muscle scars united; posterior faint; nacre dull whitish.

Animal with the marsupium occupying the whole of the outer branchiæ; ovules very large; ovisacs not separated by a sulcus; inner gills the larger in front, free from the abdominal sac part of the way, all four united to the mantle to the posterior end; mantle with a double border; branchial opening large, with many crowded papillæ; anal opening smooth; animal whitish.

† HEMILASTENA AMBIGUA Say.

[a] *Alasmodonta ambigua* SAY, Jl. Ac. N. Sci. Phila., V, 1825, p. 131.—[b] FERUSSAC, Guer. Mag., 1835, p. 26.
[a] *Margaritana ambigua* KUSTER, Conch. Cab. Unio, 1862, p. 300, pl. XCIX, fig. 7.—[b] P.ETEL, Conch. Sam., III, 1890, p. 173.
[a] † *Unio hildrethianus* LEA, Tr. Am. Phil. Soc., V, 1834, p. 36, pl. III, fig. 8; [a] Obs., I, 1834, p. 148, pl. III, fig. 8.—[a] HANLEY, Test. Moll., 1842, p. 196; [a] Biv. Shells, 1843, p. 196, pl. XXIII, fig. 38.—[a] CATLOW and REEVE, Conch. Nom., 1845, p. 59.—[a] KUSTER, Conch. Cab. Unio, 1861, p. 206, pl. LXVIII, fig. 8.—[a] SOWERBY, Conch. Icon., XVI, 1866, pl. XXXVI, fig. 192.—[a] BAKER, Moll. Chicago, Pt. 1, 1898, p. 71, pl. V, fig. 4.
[a] *Margarita* (*Unio*) *hildrethianus* LEA, Syn , 1836, p. 28; 1838, p. 20.
[a] *Margaron* (*Margaritana*) *hildrethianus* LEA, Syn., 1852, p. 43; 1870, p. 69.
[a] *Strophitus hildrethiana* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 263.
[a] *Baphia hildrethiana* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 499.
[a] *Margaritana hildrethiana* B. H. WRIGHT, Check List, 1888.—[b] P.ETEL, Conch. Sam., III, 1890, p. 173.
[a] *Alasmodonta dubia* FERUSSAC, Guer. Mag., 1835, p. 26.

Ohio River system; north to Michigan; west to Iowa; south to Arkansas; east to Tennessee.

[1] Dr. Lea does not mention this in his Synopsis.

[2] This species, the only member of the group, differs from *Margaritana* in the beak sculpture, the thickening of the anterior end of the shell, in the want of muscle scars in the shell cavities, in the color of the animal, and in having the gills united to the mantle posteriorly to their ends, and the shell is not that of a *Unio*, as it differs in the beak sculpture and the teeth. I regret that Lea's well-known name must be displaced for the obscure one of Say, who undoubtedly had this shell before him when he described his *Alasmodonta ambigua*.

Genus MARGARITANA Schumacher, 1817.

(Type, *Mya margaritifera* Linnæus.)

Baphiæ MEUSCHEN, Mus. Gevers, 1787, p. 472.
Unio RETZIUS, part, Diss. Hist. Nov. Test. Gen., 1788, p. 16.
Unio OKEN, Lehrbuch der Nat., 1815, p. 236.
Margaritana SCHUMACHER, Essai Nouv. Syst., 1817, p. 137.
Damalis (LEACH manuscript) GRAY, Pr. Zool. Soc. Lond., 1847, p. 196.
Baphia H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 499.[1]

Shell elongated, usually arcuate, rounded in front, almost lacking a posterior ridge; beaks rather low, the sculpture consisting of a few coarse, parallel ridges, which follow the growth lines; epidermis concentrically striate, brownish or blackish; hinge teeth generally imperfect or not fully developed; two more or less perfect pseudocardinals in the left valve, and one in the right, often reduced to mere tubercles; behind these the hinge plate is narrow and rounded for some distance; laterals short, usually imperfect or wholly wanting; cavity of the beaks rather shallow; muscle scars large, those of the anterior roughened, posterior elliptical; nacre generally more or less covered inside the palleal line with small muscle scars.

Animal with very long gills, inner wider in front, free for the greater part of their length from the abdominal sac, the two pairs united to their posterior ends, which project backward for some distance unconnected with the mantle; palpi very large, falcate, united half way posteriorly; branchial opening having crowded, often arborescent papillæ arranged in folds; anal opening smooth or crenulate; superanal opening not closed below; marsupium occupying the entire outer gills.[2] Foot and abdomen small; whole animal dark colored.

† MARGARITANA MARGARITIFERA Linnæus.

Mya margaritifera LISTER, Hist. Anim. Ang. App., 1685, pl. 1, fig. 1.—Hist. Conch., 1685, pl. CXLIX, fig. 4.—* LINNÆUS, Systema. Nat., 10th ed., I, 1758, p. 671.—* DA COSTA, Hist. Nat. Brit., 1778, p. 225, pl. XV, fig. 33.—* GMELIN, Syst. Nat., 13th ed., 1792, p. 3219.[3]—* LINNÆUS, Fauna Suecica, 1761, p. 2130.—KNORR, Vergn., IV, 1769, pl. XXV, fig. 2.—* MÜLLER, Vermes, 1774, p. 210.—PENNANT, Brit. Zool., IV, 1777, pl. XLIII, fig. 18.—* DA COSTA, Hist. Nat. Brit., 1778, p. 225, pl. XV, fig. 3.—* SCHRÖTER, Fluss Conch., 1779, p. 168, pl. IV, fig. 1.—* BORN, Test. Mus. Vind., 1780, p. 21.—* SCHRÖTER, Ein. Conch., 1783, II, p. 606.—* DONOVAN, Brit. Shells, III, 1801, pl. LXXIII.—* MONTAGU, Test. Brit., 1803, p. 33.—* TURTON, Brit. Fauna, 1807, p. 146.—* MATON and

[1] The name *Baphiæ* Meuschen has precedence, but was never described; it was applied to a miscellaneous lot of bivalves, and is in the plural number. Retzius' first species in *Unio*, the type of a section without laterals, is the *U. margaritifer*, but in 1792 Bruguière in Choix de Mémoires, I, p. 106, fully and carefully redefined the genus *Unio*, restricting it to species with cardinal and lateral teeth.

[2] According to Van Wahl. I have examined a great many animals taken at different seasons, but have never seen one gravid.

[3] Refers to Conchylien Cabinet VI, pl. 1, fig. 5, which is the form we know as *Margaritana margaritifera*.

RACKETT, Tr. Linn. Soc. Lond., VIII, 1807, p. 40.—* WOOD, Gen. Conch., I, 1815, p. 107, pl. XXIII, figs. 1–3.—* DILLWYN, Cat., I, 1817, p. 52.—* TURTON, Conch. Dict., 1819, p. 106.—* BINGLEY, Useful Knowledge, III, 1825, p. 245.—* WOOD, Index Test., 1825, p. 12, pl. II, fig. 30.—* EATON, Zool. Text-Book, 1826, p. 216.—* WAARDENBERG, Com. Hist. Nat. Anim., 1827, p. 360.—* CHENU, Bib. Conch., 1st ser., I, 1845, p. 57, pl. XX, figs. 1, 2.—* HANLEY, Ipsa. Linn. Conch., 1855, p. 460.—* HANLEY (WOOD), Ind. Test., 3d ed., 1856, p. 16, pl. II, fig. 30.

Mya margaritifera testa ovali oblonga, etc.—* MÖLLER, Zool. Danicæ, 1776, p. 245.—* CHEMNITZ, Conch. Cab., VI, 1782, p. 15, pl. I, fig. 5.

* *Baphia margaritifera* MEUSCHEN, Mus. Gevers, 1787, p. 472.

* *Unio margaritifera* DRAPARNAUD, Tab. Moll. Fr., 1801, p. 107; Hist. Moll. Fr., 1806, p. 132, pl. X, figs. 17–19; pl. XI, fig. 5.[1]—* GAERTNER, Vers. Syst., 1813, p. 37.—* OKEN, Lehrbuch, 1815, p. 238.—* CUVIER, Régne Animal, II, 1817, p. 473.—* C. PFEIFFER, Nat. Deutsch. Land und Suss. Moll., 1821, Pt. 1, p. 115, pl. V, fig. 11.—* BOSC, Hist. Nat. Coq., III, 1824, p. 139.—* GRAS, Moll. Isère. Ap., 1840, p. 22.—* FRIELE, Norske L. Fersk Moll., 1853, p. 53.

* *Margaritana margaritifera* SCHUMACHER, Essai. Nouv. Syst., I, 1817, p. 124, pl. X, fig. 4.—* MICHAUD, Comp. Hist. Moll. Fr., 1831, p. 114.—* SCHOLZ, Schleis L. and W. Moll., 1843, p. 135.—* TROSCHEL, Arch. für Naturg., XIII, Pt. 1, 1847, p. 270; VI, fig. 1.—* MOQUIN-TANDON, Hist. Moll. Fr., 1855, p. 623, pl. XXII, figs. 14–16.—* VON WAHL, Arch. für die Nat. Kunde Liv., 2d ser., I, 1855, p. 118.—* KUSTER, Conch. Cab., 1856, p. 293, pl. XXXVIII; XXXIX, figs. 2–4.—* CHENU, Manual, 1859, II, p. 144, fig. 710.—* WESTERLUND, Faun. Sw Nor. and Den., 1873, p. 577.—* HARTMAN and MICHENER, Conch. Cest., 1874, p. 91, fig. 189.—* CLESSIN, Deutsch. Ex. Moll., 1876, p. 449, fig. 293.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 173.—* STEARNS, Pr. U. S. Nat. Mus., XIV, 1891, p. 105.—* LOCARD, Coq. de France, 1893, p. 149.—* VON IHERING, Abh. Senck. Nat. Ges., XVIII, 1893, p. 155.—* WESTERLUND, Act. Soc. F. and F. F., XIII, No. 7, 1897. p. 166.

* *Alasmodonta margaritifera* CONRAD, New F. W. Shells, 1834, p. 72.—FERUSSAC, Guer. Mag., 1835, p. 26.

* *Margarita* (*Margaritana*) *margaritifera* LEA, Syn., 1836, p. 45; 1838, p. 28.

* *Margaron* (*Margaritana*) *margaritifera* LEA, Syn., 1852, p. 43; 1870, p. 69.

* *Baphia margaritifera* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 499, III, pl. CXVII, figs. 2, 2*a*.

* *Unio margaritiferus* RETZIUS, Dis. S. Hist. Nat., 1788, p. 16.—* SPENGLER, Skriv. Nat. Selsk., III, 1793, p. 52.—* TURTON, Conch. Ins. Brit., 1822, p. 241, pl. XVI, fig. 1.—* NILSSON, Hist. Moll. Svec., 1822, p. 103.—* TURTON, Man. L. and F. W. Shells, 1831, p. 19, fig. 9.—* ? ANTON, Verz. der Conch., 1839, p. 15.—* HANLEY, Test. Moll., 1842, p. 213; *Biv. Shells, 1843, p. 213.—* CATLOW and REEVE, Conch. Nom., 1845, p. 60.—* FORBES and HANLEY, Hist. Brit. Moll., II, 1853, p. 146, pl. XXXVIII.—* SOWERBY, Ill. Ind. Brit. Shells, 1859, pl. VII, No. 1.—* TATE, L. and F. W. Moll. Brit., 1866, pl. III, fig. 15.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXIV, fig. 325.

* *Alasmodon margaritiferus* BROWN, L. and F. W. Conch., 1836, p. 112, pl. XXI, fig. 13, pl. XXII, figs. 1–3.—* THOMPSON, Ann. and Mag. Nat. Hist., VI, 1840, p. 197.—* BROWN, Ill. Recent Conch., 1844, p. 83, pls. XXX, figs. 1–4; XXXI, figs. 1, 2; XXXII, figs. 13–15.—* TURTON, Man. L. and F. W. Shells, 1857, p. 277, pl. II, fig. 9.

* *Margaritana margaritiferus* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 184.

* *Alasmodon margaritiferum* FLEMING, Hist. Brit. Moll., 1828, p. 417.

* *Unio margaritifer* var. *minor* ROSSMASSLER, Icon., Pt. 2, 1835, p. 19, pl. IX, fig. 129.

[1] The figures on pl. X are of Linnæus's species; that on pl. XI may be *Unio batavus* Lamarck.

* *Unio margaritifer* KUSTER, Conch. Cab., 1856, p. 130, pls. XXXVIII, XXXIX.—* MOQUIN-TANDON, Moll. Terr. et Fluv. Fr., II, 1855, p. 566, pl. XLVII.—* NORDENSKIÖLD and NYLANDER, Fin. Moll., 1856, p. 86, pl. VI, fig. 74.—* DROUET, Nay. Fr., II, 1857, p. 57, pl. I.—* HESSLING, Perl. und Ihre Perlen, 1859, p. 86, pl. I.—* JEFFREYS, Brit. Conch., I, 1862, p. 37.—* REEVE, L. and F. W. Moll. Brit., 1863, p. 223, fig. 3.—* L. ADAMS, Coll. Man., 1884, p. 19, pl. I, fig. 12.

* *Unio* (*Margaritana*) *margaritifer* SCHRENCK, Reis. und F. im Amur-Lande, II, 1867? p. 700.

* *Unio auricularius* SPENGLER, Skriv. Nat. Selsk., III, 1793. p. 44.

* *Unio elongata* LAMARCK, Ann. sans Vert., VI, 1819, p. 70.[1]—STARK, Nat. Hist., II, 1828, p. 90.—GRAS, Moll. Isère Ap., 1840, p. 22.—PUTON, Moll. Vosges., 1847, p. 72.

* *Damaris elongata* LEACH, Syn. Moll. Gt. Brit., 1852, p. 322.

* *Margaritana elongata* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 185.—* LOCARD, Coq. de Fr., 1893, p. 149, fig. 162.

* *Unio elongatus* NILSSON, Hist. Moll. Svec., 1822, p. 106.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXVI, fig. 397.—* PÆTEL, Conch. Sam., III, 1890, p. 151.

* *Alasmodonta arcuata* BARNES, Am. Jl. Sci., VI, 1823, p. 277, pl. XII, fig. 20.—* C. B. ADAMS, Thompson's Hist. of Vermont, 1842, p. 165, figured; * F. W. and L. S. of Vt., 1842, p. 165, figured.—* HESSLING, Die. Perl. und Ihre Perlen, 1859, p. 205.

* *Mya arcuata* EATON, Zool. Text Book, 1826, p. 222.

* *Alasmodon arcuata* GOULD, Inv. of Mass., 1841, p. 113, fig. 75.—* DE KAY, Zool. of N. Y., Pt. 5, 1843, p. 197, pl. XIV, fig. 224.—* MIGHELS, Bost. Jl. N. Hist., 1844, p. 325.

* *Margaritana arcuata* STIMPSON, Shells of N. Eng., 1851, p. 15.—* KUSTER, Conch. Cab., 1856, p. 293, pl. XXXIX, fig. 1.—* CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 262.—* GOULD, Inv. of Mass., 1870, p. 174, fig. 477.—* PÆTEL, Conch. Sam., III, 1890, p. 172.—* H. CARPENTER, Naut., IV, 1890, p. 35.

* *Unio sinuata* C. PFEIFFER, Nat. Deutsch. L. und S. W. Moll., Pt. 2, 1825, p. 33, pl. VII, fig. 4.

* *Unio roissyi* MICHAUD, Comp. Hist. Moll., Fr., 1831, p. 112, pl. XVI, fig. 28.—* GRAS, Moll. Isère Ap., 1840, p. 22.

* *Margaritana roissyi* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 186.—* LOCARD, Coq de France, 1893, p. 150.

* *Unio tristis* MORELET, Moll. Portugal, 1845, p. 107, pl. XIII, fig. 2.[2]

* *Margarita* (*Unio*) *crassissimus* LEA, Syn., 1836, p. 40; 1838, p. 26.[3]

* *Unio* (*Alasmodonta*) *dahuricus* MIDDENDORFF, Bull. Phys. Math. Ac. St. Petersb., IX, 1850, p.?; * Sib. Reise, II, 1851, p. 275, pl. XXVI, figs. 3–5.

* *Unio dahuricus* MIDDENDORFF, L. and S. Moll. Sib., 1859, p 26.—* HESSLING, Perl. und Ihre Perlen, 1859, p. 202.—* WESTERLUND, Kong. Sv. Vet. Ak. Hand., XIV, No. 12, p. 74.

* *Unio* (*Margaritana*) *dahuricus* SCHRENCK, Reis. und Forsh. Amur-Lande, II, 1867, p. 699.

* *Margaritana dahurica* KOBELT, Abh. Senck, Nat. Ges., XI, 1875, p. 427.—* KOBELT, Faun. Jap. Ext., 1879, p. 143, pl. XIII, figs. 1, 2.—* MIDDENDORFF, Kong. Svensk. Vetens. Ak. Handl., XIV, No. 12, p. 110.—PÆTEL, Conch. Sam., III, 1890, p. 173.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 187.

[1] Lamarck thinks this may be the *Mya margaritifera* of Linnæus; Lea is certain that it is.

[2] The figure looks like an elongated *batavus*, but Morelet afterwards acknowledged that his shell was probaly a young *margaritifera*.

[3] The naked name *crassissima* was first applied to this by Klein, Methodi Ostracologicæ, 1753, p. 128, pl. X.

[a]† *Alasmodon falcata* GOULD, Pr. Boston Soc. Nat. Hist., III, 1850, p. 294; [b] Otia Conch., 1862, p. 87;[1]—[c] U. S. Expl. Exp., XII, 1852, p. 433, figs. 545, 545*a*, 545*b*.—CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 262.—P.ETEL, Conch. Sam., III, 1890, p. 173.

[d] *Unio falcatus* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXV, fig. 390.

[e] *Unio* (*Alasmodonta*) *complanatus* MIDDENDORFF, Sib. Reise, II, 1851, Pt. 1, p. 273, pl. XXVII, figs. 1–6.[2]

[f] *Margaritana complanata* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 187.

[g] *Unio mongolicus* MIDDENDORFF, Sib. Reise, II, 1851, p. 277, pl. XXVII, figs. 7, 8.—[h] HESSLING, Perl. und Ihre Perlen, 1859, p. 203.—[i] SCHRENCK, Reise und F. im Amur-Lande, II, 1867, p. 699.—[j] WESTERLUND, Kong. Sv. Vet. Ak. Hand, XIV, no. 12, 1876, p. 74.—[k] P.ETEL, Conch. Sam., III, 1890, p. 159.—[l] WESTERLUND, Faun. der Pal., II, Pt. 7, 1890, p. 113.

[m] *Alasmodon yubaensis* TRASK, Pr. Cal. Acad. Sci., I, 1855, p. 30.

[n] *?Margaritana rarevelliana* CHENU., Man., 1859, II, p. 144, fig. 714.[3]

All Europe except the southernmost portion; northern Asia; Japan; northern North America; Iceland. Its southern limit seems to be about north latitude 40°. It appears to be entirely circumboreal, except that, so far as is known, it is missing in the central part of the North American continent. Wetherby has suggested that it may have been destroyed in this region by the ice of the glacial epoch. It is found in the upper Missouri and in Canada East, New York, and the New England States.

† MARGARITANA CRASSA Retzius.

[a] *Mya testa crassa*, SCHRÖTER, Flussconch., 1779, p. 182, pl. II, fig. 2.

[b] *Unio crassus* RETZIUS, Diss. Hist. Nat., 1778, p. 17.[4]—SPENGLER, Skriv. Nat. Selsk., III, 1793, p. 56.—[c] SCHOLZ, Schles., L. und W. Moll., 1843, p. 130.—[d] VON WAHL, Arch. Naturkunde Liv., 2d. ser., I, 1855, p. 94.—[e] H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—[f] DROUET, Moll. Cote d'Or., 1867, p. 101.—[g] JORDAN, Jahrb. Deutsch. Mal. Ges., VI, 1879, p. 306.—[h] DROUET, Mem. Acad. Dijon, 3d ser., VII, 1882, p. 13.[5]—[i] P.ETEL, Conch. Sam., III, 1890, p. 149.

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[1] This is undoubtedly *margaritifera*, but in the types the young shells show laterals.

[2] I have no doubt that this is *Margaritana margaritifera* L. and not *Unio complanatus* Solander as Middendorff supposes. The specimens figured are terribly eroded, and the hinges are in very bad order, but they do not show laterals.

[3] Numerous varieties as well as species have been made of this abundant, widespread form. Notwithstanding its enormous distribution, the widest of any Naiad known, I have seen no variation that seems to me to be worthy of a varietal name.

[4] Retzius' description is in Latin, and consists of ten words, and as he does not figure the species, it would be impossible to determine what he meant only for the fact that he refers to the Flussconchylien of Schröter (*Mya testa crassa*, p. 182, pl. II, fig. 2). Schröter's figure is not a very good one, but I can have no doubt that he had before him the large, heavy, black Naiad, with lateral teeth, found in southern Europe. In general it closely resembles the *M. margaritifera* externally, but the epidermis is a more dull black, the beaks are usually higher and more strongly developed, the nacre is white, and it has fairly well-developed laterals. European conchologists seem to have quite commonly mistaken heavy, large forms of *Unio batavus* for Retzius' species, and in a number of cases the *M. margaritifera* has been taken for it.

[5] Page 13 of reprint; I have not seen the original.

* *Margaron* (*Unio*) *crassus* LEA, Syn., 1852, p. 39; 1870, p. 62.[1]

* *Unio auricularius* SPENGLER, Skriv. Nat. Selsk., III, 1792, p. 54.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 50.

Unio rugosa POIRET, Coq. Fluv., et Terr. de l'Aisne, 1801, p. 105.[2]

* *Unio sinuata* LAMARCK, An. sans Vert., VI, 1819, p. 70.[3]—BLAINVILLE, Man., 1825, p. 539, pl. LXVII, fig. 3.—* DESHAYES, Enc. Méth., II, 1827, p. 151, pl. CCXLVIII, fig. 1; II, 1830, p. 579, pl. CCXLVIII, fig. 1, 1*a*, 1*b*.[4]—* SGANZIN, Mem. Hist. Nat. Strasb., III, 1842, II, p. 8.[5]—* PUTON, Moll. Vosges, 1847, p. 72.

* *Unio* (*Potamida*) *sinuata* SWAINSON, Tr. on Mal., 1840, p. 268.

* *Unio sinuatus* ROSSMASSLER, Icon., III, 1836, p. 22, pl. XIII, fig. 195.—* GASSIES, Moll. de l'Ag., 1849, p. 198.—* DUPUY, Hist. Moll. Fr., 1852, p. 630, pl. XXIII, fig. 7.—* ROSSMASSLER, Icon., III, 1854, p. 38, pl. LXX, fig. 853, 853*a*.[6]—* MOQUIN-TANDON, Moll. Terr. and Fluv. Fr., II, 1855, p. 567; III, pl. XLVIII, figs. 1-3.—* DROUET, Nay. Fr., II, 1857, p. 61, pl. II.—* HESSLING, Die Perl. and Ihre Perlen, 1859, p. 184.—* SOWERBY, Conch. Icon., XVI, pl. LXII, fig. 311.—* PÆTEL, Conch. Sam, III, 1890, p. 167.—* LOCARD, Coq. de Fr., 1893, p. 151, fig. 164.

* ? *Unio litoralis* C. PFEIFFER, Nat. Deutsch. L. und S. W. Moll., Pt. 1, 1821, p. 117, pl. V, fig. 12.[7]

* *Unio crassissimus* HANLEY, Test. Moll., 1842, p. 209; * Biv. Shells, 1843, p. 209, pl. XXIII, fig. 54.—* CATLOW and REEVE, Conch. Nom., 1845, p. 58.

* *Unio gargottæ* PHILIPPI, Moll. Sic., 1836, p. 66.—* ROSSMASSLER, Icon., VII and VIII, 1838, p. 26, pl. XXXV, fig. 493.[8]—* DROUET, Jl. de Conch., XXIX., 1881, p. 25.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 156.

Southern Europe; possibly into Asia Minor and southwest Siberia.

† MARGARITANA LAOSENSIS Lea.

* *Unio laosensis* LEA, Pr. Ac. Nat. Sci. Phila., VII, 1863, p. 190; * Jl. Ac. N. Sci. Phila., VI, 1866, p. 63, pl. XXI, fig. 61; * Obs., XI, 1867, p 67, pl. XXI, fig. 61.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XLVII, fig. 256.—* PÆTEL, Conch. Sam., III, 1890, p. 156.

* *Margaron* (*Unio*) *laosensis* LEA, Syn., 1870, p. 62.

Unio sula THEOBALD (where?).

Laos Mountains, Cambodia; Siam.

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[1] It has often been impossible to determine what species has been referred to by authors under the name *crassus*. In cases where they have cited this species from the north of Europe I have no doubt that they either had *Margaritana margaritifera* or *Unio baturus* before them. In those cases where I could not be certain as to what was meant I have omitted references.

[2] According to Moquin Tandon this is *U. sinuatus* Lamarck.

[3] Lamarck refers to Encyc. Méth., 1797, pl. CCXLVIII, figs. 1*a*, 1*b*, which seem to be the *crassus* of Retzius. Lea, who examined Lamarck's type, says he had thought it was the *Margaritana margaritifera*, but that it had lateral teeth. (Obs. I, pp. 35, 198.)

[4] These figures look something like a heavy inflated *Lampsilis alatus* Say, but are probably the *crassus* of Retzius.

[5] Given to Sganzin by M. Fabert, chief of batallion of infantry, as having been found at St. Paul in the Isle of Bourbon, but Sganzin very much doubts the locality. Of course it was never found in the Indian Ocean region.

[6] A magnificent figure of this fine species, and in *a*, which shows the hinge, the laterals are plainly delineated.

[7] Dr. Lea is doubtful about this being *litoralis*, and I am sure it is not. It appears more like *M. crassus* than anything else.

[8] Dr. Lea makes this a synonym of Pfeiffer's *elongatulus*, which is, I believe, quite near to *U. pictorum*. Rossmassler's figure shows a shell very much like *Margaritana margaritifera, but it has lateral teeth.*

†MARGARITANA HEMBELI Conrad.

* *Unio hembeli* CONRAD, Monog., X, 1838, p. 93, pl. LI, fig. 1.—* HANLEY, Biv. Shells, 1856, p. 383, pl. XXIV, fig. 3.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* SOWERBY, Conch. Icon., XVI, 1866, pl. LXXIII, fig. 172.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 154.

* *Margaron* (*Unio*) *hembeli* LEA, Syn., 1852, p. 21; 1870, p. 32.

Louisiana; Burnt Corn, Alabama.

†MARGARITANA MONODONTA Say.

Unio monodonta SAY, N. Harm. Diss., II, 1829, p. 293; * Am. Conch., I, 1830, pl. VI.—SHORT and EATON, Trans. Jl., 1831, p. 79.—* CONRAD, New F. W. Shells, 1834, p. 70.—DESHAYES, An. sans. Vert., 2d ed., VI, 1835, p. 553; 3d ed., II, 1839, p. 674.—* CHENU, Bib. Conch., 1st ser., III, 1845, p. 12, pl. II, fig. 1.—*CATLOW and REEVE, Conch. Nom., 1845, p. 61.

* *Alasmodonta monodonta* FERUSSAC, Guer. Mag., 1835, p. 26.

* *Margaritana monodonta* CONRAD, Pr. Ac. N. Sci., Phila. VI, 1853, p. 262.

* *Unio monodontus* SAY, Am. Conch., VI, 1834.—* HANLEY, Test. Moll., 1842, p. 210; * Biv. Shells, 1843, p. 210, pl. XXIII, fig. 48.—* H. and A. ADAMS, Gen., Rec. Moll., II, 1857, p. 491.—* KUSTER, Conch. Cab., 1861, p. 221, pl. LXXV, fig. 1.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 159.

* *Margarita* (*Unio*) *monodontus* LEA, Syn., 1836, p. 40; 1838, p. 26.

* *Margaron* (*Unio*) *monodontus* LEA, Syn., 1852, p. 39; 1870, p. 62.

* *Unio soleniformis* LEA, Tr. Am. Phil. Soc., LV, 1831, p. 87, pl. X, fig. 17; * Obs., I, 1834, p. 97, pl. X, fig. 17.—* CHENU, Ill. Conch., 1858, pl. XIV, figs. 4, 4*a*, 4*b*; * Manual, II, 1859, p. 137, fig. 661.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XLV, fig. 243.

* *Margaritana soleniformis* PÆTEL, Conch. Sam., III, 1890, p. 173.

Ohio; Cumberland, and Tennessee river systems; Illinois; eastern Iowa; Nebraska?.

†MARGARITANA DECUMBENS Lea.

* *Unio decumbens* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 40.—* LEA, Jl. Ac. N. Sci. Phila., 1862, p. 87, pl. XII, fig. 236.—* LEA, Obs., VIII, 1862, p. 91, pl. XII, fig. 236.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXII, fig. 432.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *decumbens* LEA, Syn., 1870, p. 62.

Alabama.

Genus UNIO Retzius, 1788.[1]

(Type, *Unio tumidus* Retzius.)

Unio RETZIUS, Diss. Hist. Nov. Test. Gen., 1788, p. 16.—BRUGUIERE, Choix de Memoirs, I, 1792, p. 106.

Limnæa POLI (part), Test. Utr. Sic., I, 1791, p. 31.

Lymnium OKEN, Lehrbuch, 1815, p. 237.

Elliptio RAFINESQUE, Jl. de Phys. Nat. Hist., 1819, p. 426.

Mysca TURTON, Conch. Ins. Brit., 1822, p. 243.

[1]This genus was described in a thesis by Laurentius Münter Philipsson under his master, Retzius, in the University of Lund, Sweden, and it is often credited to the former. I am informed by Professor Joh. Chr. Moberg, of Lund, that by a former law or custom of the university the professor was considered the author of all papers which a student under him defended. According to this, Retzius must be credited with the genus. This law was repealed in Lund in 1852.

Canthyria SWAINSON, Tr. on Mal., 1840, p. 278.
Uniomerus CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 268.

Shell inequilateral, oval to elongated, rounded in front and pointed or biangulate behind, with a more or less developed posterior ridge, often becoming slightly arcuate when old; beaks only moderately full, generally sculptured with coarse ridges, which run parallel with the growth lines, or are somewhat doubly looped, sometimes broken and showing fine radiating lines behind; surface smooth, slightly concentrically ridged or pustulous; epidermis generally rather dull colored, rayless or feebly rayed; hinge plate narrow; two pseudocardinals and two laterals in the left valve and one pseudocardinal and one lateral in the right, with rarely a vestige of a second lateral; cavity of the beaks not deep or compressed. Animal having the inner branchiæ free from the abdominal sac for from one-half to their entire length; marsupium occupying the whole length of the outer gills only, forming a thick, smooth pad when filled with young; gills united to the mantle behind to their extreme points, or very nearly so; papillæ on branchial and anal openings unbranched; superanal opening always closed below.

Section LYMNIUM Oken, 1815.

(Type, *Unio pictorum* Retzius.)

Shell generally smooth; beak sculpture broken, often somewhat corrugated or pustulous; pseudocardinals compressed; beak cavities well excavated, not compressed. Animal highly colored, anal opening crenulate or smooth.

(Group of *Unio pictorum*.)

Shell inflated, elongate, oval, anterior end angled above, swollen a little at posterior base; beaks full, their sculpture consisting of numerous slightly doubly looped bars which often become pustulous; posterior ridge rather low; epidermis smooth, rather bright, sometimes slightly rayed behind; rest periods well marked; pseudocardinals compressed, often a little reflexed, smooth below, those of the left valve partly united; muscle scars smooth; nacre whitish to salmon. Animal the same as described for the section.

† UNIO PICTORUM Linnæus.[1]

[r] *Mya pictorum* LINNÆUS, Syst. Naturæ, 10th ed., 1758, I, p. 671; Faun. Suec., 1761, No. 2129.—[s] MÜLLER, Vermes, 1774, p. 211.—PENNANT, Brit. Zool., IV, 1777? pl. XLIII, fig. 17.—[t] DA COSTA, Hist. Nat. Brit., 1778, p. 228, pl. XV, fig. 4.—[u] SCHRÖTER, Flussconch., 1779, p. 178, pl. III, figs. 2, 4, 5.—[v] BORN, Test. Mus. Vind., 1780, p. 20.—[w] SCHRÖTER, Ein. Conch., 1783, II, p. 604.—[x] OLIVI, Zool. Adriatic, 1792, p. 95.—STURM, Deuts. Faun., VI, 1803, 2d ed, p. 19, pls. *a*, *b*, *c*.—[y] MONTAGU, Test. Brit., 1803, p. 36.—[z] TURTON, Brit. Fauna,

[1] Hanley says [Ipse Linnæi Conchylia, p. 27]: "More Uniones than one are present in the [Linnæan] collection, but upon the whole the *U. pictorum* of authors [Rossm. Icon., fig. 196] agrees best with synonymy and description. The figure referred to of Lister is *U. pictorum;* Bonanni's drawing is more doubtful and was possibly meant for *U. tumidus*. The descriptions in Fauna Suecica and Systema are brief and unsatisfactory and might suit either species alike."

1807, p. 146.—* MATON and RACKETT, Tr. Linn. Soc. Lond., VIII, 1807, p. 38.—* WOOD, Gen. Conch., I, 1815, p. 104, pl. XIX, figs. 3, 4.—* DILLWYN, Cat., I, 1817, p. 49.—* TURTON, Conch. Dict., 1819, p. 106.—* WOOD, Index Test., 1825, p. 12, pl. II, fig. 26c; * rev. ed., 1856, p. 15, pl. II, fig. 26.—* ?CHENU, Bib. Conch., 1st ser., I, 1845, p. 114, pl. XLVII, figs. 8, 9.[1]—* HANLEY, Ipsa. Linn. Conch., 1855, p. 460.

* *Unio pictorum* RETZIUS, Diss. Hist. Nat., 1778, p. 17.—* SPENGLER, Skriv. Selsk. Nat., III, 1793, p. 59.—* DRAPARNAUD, Tab. Moll. Fr., 1801, p. 106; in part Hist. Moll. Fr., 1806, p. 131, pl. XI, fig. 4.[2]—* GAERTNER, Vers. Ein. Syst., 1813, p. 36.—* MILLET, Moll. Maine et Loire, 1813, p. 74.—* BRARD, Hist. Coq. Paris, 1815, p. 226, pl. VIII, fig. 1.—BROOKES, Int. to Conch., 1815, p. 51, pl. II, fig. 12.—* CUVIER, Regne Animal, II, 1817, p. 473.—* KLEES, Diss. Test., 1818, p. 45.—* LAMARCK, An. sans Vert., VI, 1819, p. 77.—*C. PFEIFFER, L. and Suss. Moll., Pt. I, 1821, p. 115, pl. V, figs. 9, 20.—* NILSSON, Hist. Moll. Svec., 1822, p. 111.—* BOSC, Hist. Nat. Coq., III, 1824, p. 139, pl. XXIII, fig. 3.—* BLAINVILLE, Manual, Mal., 1825, p. 539, pl. LXVII, fig. 2.—*CROUCH, Ill. Int. Lamarck, 1827, p. 16, pl. IX, figs. 4, 4*a*, 4*b*.—* WAARDENBERG, Com. Hist. Nat., 1827, p. 36.—* KLEEBERG, Moll. Boruss, 1828, p. 38.—STARK, Nat. Hist., II, 1828, p. 90.—* FLEMING, Hist. Brit. Animals, 1828, p. 416.—* GOUPIL, Hist. Moll. Sarthe, 1835, p. 84.—* ROSSMASSLER, Icon., I, 1835, p. 118, pl. III, figs. 71, 71*a*, 71*b*; III, 1836, p. 23, pl. XIII, fig. 196; VI, 1837, p. 55, pl. XXIX, fig. 409; IX, 1839, p. 10, pl. XLV, fig. 587–590; XI, 1842, p. 14, pl. LV, fig. 741; XII, 1844, p. 30, pl. LVIII, figs. 762–766; p. 31, pl. LIX, figs. 767–769.—* FOURNEL, Faun. Moselle, I, 1836, p. 486.—* FLEMING, Moll. Animals, 1837, pl. XIV, fig. 51.—* WYATT, Man. Conch., 1838, p. 67, pl. VIII, fig. 6.—* PORRO, Mal. Como., 1838, p. 117.—* TERVER, Moll. Terr. et Fluv., 1839, p. 39.—* ANTON, Verz. der Conch., 1839, p. 15.—* ? GRAS, Moll. Isere., 1840, p. 71, pl. I, fig. 8.[3]—* HANLEY, Test. Moll., 1842, p. 205; * Biv. Shells, 1843, p. 205.—* SCHOLZ, Schleis, L. and W. Moll., 1843, p. 127.—*CATLOW and REEVE, Conch. Nom., 1845, p. 62.—* STABILE, Faun. Lug., 1845, p. 60, pl. III, fig. 73.—* MORELET, Moll. Port., 1845, p. 108.—* BROWN, L. and F. W. Conch., 1845, p. 107, pl. XIX, figs. 1–4.—* PUTON, Moll. Vosges, 1847, p. 70.—*STEIN, Die Lebend. Schneck., 1850, p. 104, pls. XXIV, XXV, figs. 1, 2.—* MIDDENDORFF, Sib. Reise, II, 1851, p. 276, pl. XXVIII, figs. 1–3.—* LEACH, Syn. Moll. Gt. Brit., 1852, p. 234.—* DUPUY, Hist. M. Fr., 1852, p. 617, pl. XXVI, fig. 20.—* FORBES and HANLEY, Hist. Brit. Moll., II, 1853, p. 142, pl. XXXIX, fig. 1.—* KUSTER, Conch. Cab. Unio, 1854, p. 88, pl. XXIII, figs. 1, 2; pl. XXIV; XXV, figs. 1, 2.—* MOQUIN-TANDON, Moll. Terr. Fluv. Fr., II, 1855, p. 576, pl. L, figs, 8, 10; LI, figs. 1, 10.—* VON WAHL, Arch. Naturk. Liv. Est., 2d ser., 1855, p. 105.—* NORDENSKIÖLD and NYLANDER, Fin. Moll., 1856, p. 83, pl. V, fig. 72.—* DROUET, Nay. Fr., II, 1857, p. 103, pl. VIII.—* TURTON, Man. L. and F. W. Shells, 1857, p. 279, pl. II, fig. 11.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491; III, pl. CXVI, figs. 5, 5*a*, 5*b*.—* SOWERBY, Ill. Index Brit. Shells, 1859, No. 2, pl. VII.—* GOODRICH, Ill. Nat. Hist., II, 1859, p. 523, fig.—JEFFREYS, Brit. Conch., I, 1862, p. 34.—* BIELZ, Faun. Sieben, 1863, p. 192.—* REEVE, L. and F. W. Moll. Brit., 1863, p. 221, fig. 2.—* TATE, L. and F. W. Moll. G. Brit., 1866, pl. II, fig. 3.—* ? SCHRENCK, Reise und F. im Am. Lande, II, 1867, p. 696.[4]—* KOBELT, Faun. Nass. Moll., 1871, p. 241.—* WESTER-

[1] *U. batavus* perhaps.

[2] Draparnaud gives figures 1–4 for *pictorum*. One and 2 may possibly be that species, but they look more like *batavus*, and 3 is certainly *batavus*, while 4 is probably *pictorum*.

[3] Doubtful, may be *batavus*.

[4] It is very probable that the specimens from Amur Land and vicinity which have been referred to *U. pictorum* are a smooth variety of *Nodularia douglasiæ* Gray, a species resembling it in form, but not at all closely related to it.

LUND, Faun. S. N. and D., 1873, p. 571.—* LEHMAN, Die Schnecken, 1873, p. 290.—* CLESSIN, Deutsche Ex. Moll., 1876, p. 453, fig. 291.—* JORDAN, Jahrb. Deuts. Mal. Ges., VI, 1879, p. 301.—* DROUET, Mem. Acad. Dijon, VII, 1882, p. 10 (reprint).—* L. ADAMS, Coll. Man., 1884, p. 18, pl. I, fig. 11.—* ? CLESSIN, Moll. Oest., 1887, p. 723.—PÆTEL, Conch. Sam., III, 1890, p. 163.

* *Baphia pictorum* MEUSCHEN, Mus. Gevers., 1787, p. 472.

* *Lymnium pictorum* OKEN, Lehrb., 1815, p. 237.

* *Mysca pictorum* TURTON, Conch. Ins. Brit., 1822, p. 245; * Man. L. and F. W. Shells, Brit. Is., 1831, p. 20, fig. 11.

* *Margarita* (*Unio*) *pictorum* LEA, Syn., 1836, p. 36; 1838, p. 24.

* *Margaron* (*Unio*) *pictorum* LEA, Syn., 1852, p. 36; 1870, p. 58.

* *Mya augusta subflava*, etc., SCHRÖTER, Fluss. Conch., 1779, p. 184, pl. III, fig. 3; pl. IV, fig. 6.

* *Mya nodosa* GMELIN, Syst. Nat., 13th ed., 1788, p. 3222.[1]—* WOOD, Gen. Conch., I, 1815, p. 110.—* DILLWYN, Cat., I, 1817, p. 54.—* WOOD, Ind. Test., 1825, p. 12, pl. II, fig. 34*a*; * rev. ed., 1856, p. 16, pl. II, fig. 34.—* PÆTEL, Conch. Sam., III, 1890, p. 161.

* ? *Unio conus* SPENGLER, Skriv. Selsk. Nat., III, 1793, p. 60.

* *Mya ovalis* DONOVAN, Brit. Shells, III, 1801, pl. LXXXIX.—* TURTON, Brit. Fauna, 1807, p. 146.

* ? *Unio oralis* SOWERBY, Rec. and Foss. Shells, No. XVI, 1823, fig .—* ? REEVE, Conch. Syst., I, 1841, p. 117, pl. LXXXVII, fig. 1.—* CHENU, Bib. Conch., 1st ser., I, 1845, p. 67, pl. XXIV, figs. 1–3.—* PÆTEL, Conch. Sam., III, 1890, p. 162.

* *Mya nodulosa* WOOD (part), Gen. Conch., I, 1815, p. 106, pl. XXII, figs. 3, 4.[2]

* *Unio nodulosa* LAMARCK, An. sans Vert., VI, 1819, p. 78.

* *Unio rostrata* LAMARCK, An. sans Vert., VI, 1819, p. 77.—* C. PFEIFFER, Nat. Deuts. L. and Suss. Moll., Pt. 1, 1821, p. 114, pl. V, fig. 8.—* WAARDENBERG, Com. Hist. Nat. Animalium, 1827, p. 36.—* LAMARCK, Enc. Méth., II, 1830, p. 586.—* MICHAUD, Comp. Hist. Moll. Fr., 1831, p. 108, pl. XVI, fig. 25.—* BROWN, L. and F. W. Conch., 1836, p. 109, pl. XX, figs. 1, 2; * Ill. Rec. Conch., 1844, p. 82, pl. XXXII, figs. 9–12.—* PUTON, Moll. Vosges, 1847, p. 70.—* GRAS, Moll. Isere., 1840, p. 71, pl. V, fig. 21.

* *Unio rostratus* CHENU, Man., II, 1859, p. 137, fig. 658.—* WESTERLUND, Faun. der Pal., II, Pt. 7, 1890, p. 104.—* PÆTEL, Conch. Sam., III, 1890, p. 166.—* LOCARD, Les Coq. de Fr., 1893, p. 207.—WESTERLUND, Act. Soc. F. and F. F., XIII, No. 7, 1897, p. 165.

* *Unio manca* LAMARCK, An. sans Vert., VI, 1819, p. 80.

* *Unio mancus* DROUET, Moll. Côte d'Or, 1867, p. 103.—* WESTERLUND, Faun. der Pal., II, Pt. 7, 1890, p. 85.

* *Unio limosus* NILSSON, Hist. Moll. Svec., 1822, p. 110.—* ROSSMASSLER, Icon., III, 1836, p. 24, pl. XIII, fig. 199.—* KUSTER, Conch. Cab. Unio, 1854, p. 80, pls. XXI, XXII, XXIII.—* PÆTEL, Conch. Sam., III, 1890, p. 157.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 115.—* LOCARD, Coq. de Fr., 1893, p. 211.—* WESTERLUND, Act. Soc. F. and F. F., XIII, No. 7, 1897, p. 166.

* *Unio deshayesii* MICHAUD, Comp. Hist. Moll. Fr., 1831, p. 107, pl. XVI, fig. 30.—* ROSSMASSLER, Icon., III, 1836, p. 23, pl. XIII, fig. 197.—* GRAS, Moll. Isere. App., 1840, p. 21.—* BROWN, Ill. Rec. Conch., 1844, p. 81, pl. XXXII, figs. 1–4; L. and F. W. Conch., 1845, p. 108, pl. XX, figs. 3, 4.—* LOCARD, Coq. de Fr., 1893, p. 210.

* *Unio dubius* FITZINGER, Syst. Verz., 1833, p. 119.

* *Unio michaudiana* DES MOULINS, Actes Soc. Linn. Bord., VI, 1833, p. 27, plate.

* *Unio longirostris*, ROSSMASSLER, Icon., III, 1836, p. 26, pl. XIV, fig. 200; XI, 1842,

[1] Gmelin refers to Conch. Cabinet X, p. 347, pl. CLXX, fig. 1650, which is, I am quite certain, a young *U. pictorum*.

[2] Two species are figured; figs. 1 and 2 are a heavy, inflated Chinese species; figs. 3 and 4 are no doubt *pictorum*.

p. 13, pl. LIV, fig. 738.—*STABILE, Faun. Lug., 1845, p. 60.—*DROUET, Mem. Ac. Dijon, VII, 1882, p. 11 (reprint).—*WESTERLUND, Faun. der Pal., II, Pt. 7, 1890, p. 117.—*P.ETEL, Conch. Sam., III, 1890, p. 158.—*LOCARD, Coq. de Fr., 1893, p. 209.

**Potamida sicula* SWAINSON, Treatise on Mal., 1840, p. 282, fig. 58.

**Unio siculus* HANLEY, Biv. Shells, 1856, p. 383, pl. XX, fig. 19.—*PÆTEL, Conch. Sam., III, 1890, p. 167.

**Unio aradæ* PHILIPPI, Enum. Moll. Sic., III, 1844, p. 49.—*KUSTER, Conch. Cab. Unio, 1854, p. 105, pl. XXVIII, fig. 6.—*KOBELT, Icon., IV, 1876, p. 62, pl. CXVII, figs. 1146, 1147.—*DROUET, Jl. de Conch., XXIX, 1881, p. 25.

**Unio dactylus* MORELET, Moll. Port., 1845, p. 110, pl. XIV, fig. 2.—*WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 111.—*KOBELT, Icon., new, ser., VI, 1893, p. 98, pl. CXXX, fig. 1132.

**Unio mucidus* MORELET, Moll. Port., 1845, p. 111.—*KOBELT, Icon., new. ser., VI, 1893, p. 98, pl. CLXXX, figs. 1130, 1131.—*PÆTEL, Conch. Sam., III, 1890, p. 160.—*WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 111.

**Unio quinquecannulatus* KUSTER, Conch. Cab. Unio, 1854, p. 93, pl. XXV, figs. 3, 4.—*P.ETEL, Conch. Sam., III, 1890, p. 165.

**Unio pallens* KUSTER, Conch. Cab. Unio, 1854, p. 95, pl. XXV, fig. 5; XXVI, fig. 1.

**Unio viridiflavus* KUSTER, Conch. Cab. Unio, 1854, p. 96, pl. XXVI, figs. 2, 3.—*PÆTEL, Conch. Sam., III, 1890, p. 171.

**Unio petrovickii* KUSTER, Conch. Cab. Unio, 1854, p. 98, pl. XXVI, fig. 5; XXVII, fig. 1.—*PÆTEL, Conch. Sam., III, 1890, p. 163.

**Unio maltzani* KUSTER, Conch. Cab. Unio, 1854, p. 106, pl. XXIX, figs. 1, 2.—*PÆTEL, Conch. Sam., III, 1890, p. 158.

**Unio baletonicus* KUSTER, Conch. Cab. Unio, 1861, p. 231, pl. LXXVIII, fig. 1.—*SERVAIN, Hist. Mal. Bal., 1881, p. 98.

**Unio procchus* BOURGUIGNAT, Rev. et Mag., XIV, 1862, pl. XIX, figs. 1-3; XV, 1863, p. 19, XIX.—*WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 118.

**Unio actephilus* BOURGUIGNAT, Rev. et Mag., XIV, 1862, pl. XIX, figs. 7, 8, XX, fig. 3; XV, 1863, p. 20.

**Unio lawleyanus* GENTILUOMO, Bull. Mal. Ital., I, 1868, p. 54, pl. IV, figs. 1-3.

Europe generally; Siberia east to the Lena River and perhaps farther; south into Asia Minor?; Algiers?.

†UNIO PLATYRHYNCHUS Rossmassler.

**Unio platyrhynchus* ROSSMASSLER, Icon., II, 1835, p. 22, pl. IX, fig. 130; V, 1837, p. 20, pl. XXIV, fig. 338.—*PORRO, Mal. Como, 1838, p. 117.—*HANLEY, Test. Moll., 1842, p. 205; *Biv. Shells., 1843, p. 205, pl. XXIII, fig. 53.—*CATLOW and REEVE, Conch. Nom., 1845, p. 62.—*KUSTER, Conch. Cab. Unio, 1854, p. 77, pls. XIX, XX.—*SOWERBY, Conch. Icon., XVI, 1856, pl. XXX, fig. 154.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—*P.ETEL, Conch. Sam., III, 1890, p. 163.—*WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 118.

**Margarita* (*Unio*) *platyrhynchus* LEA, Syn., 1836, p. 35; 1838, p. 24.

**Margaron* (*Unio*) *platyrhynchus* LEA, Syn., 1852, p. 36; 1870, p. 58.

**Unio fiscallianus* KLECIACH, Atti. Soc. Ital., XV, 1872, p. 92.—*PFEIFFER and KOBELT, Mal. Blatt., XX, 1873, p. 92, fig.

Unio limosus *KOBELT, Icon., new ser., VI, 1893, p. 44, pl. CLVII, figs. 1024–1027.[1]

Central and southwestern Europe.

[1] According to Kobelt in above reference, his *platyrhynchus* = the *limosus* of Nilsson. Nilsson does not figure his species in Hist. Moll. Svec., but refers to pl. V, fig. 10, in Pfeiffer's Land and Susswasser Mollusken, which is plainly a *Unio pictorum*. Kobelt's figures, the latter three certainly, are genuine *platyrhynchus*, which I consider a perfectly good species.

†UNIO PLATYRINCHOIDEUS Dupuy.

Unio platyrinchoideus DUPUY, Cat. Ext. Gall. Test, 1849;[1] * Hist. Moll. Fr., VI, 1852, p. 649, pl. XXVII, fig. 16.—? DROUET, Nay. Fr., II, 1857, p. 100, pl. IX, fig. 1.—PÆTEL, Conch. Sam., III, 1890, p. 163.

* *Unio platyrhynchoideus* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 121.

* *Unio platyrrhynchoideus* SOWERBY, Conch. Icon., XVI, 1868, pl. LXX, fig. 358.

* *Unio danielis* GASSIES, Actes. Soc. Linn. de Bord, XXVI, 1866, p. 132, pl. I, fig. 8.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 110.—* PÆTEL, Conch. Sam., III, 1890, p. 150.—* LOCARD, Coq. de Fr., 1893, p. 199.

Unio lardelianus PECCHIOLI, Bull. Mal. It., II, 1869, p. 163, pl. V.

South France.

†UNIO ELONGATULUS C. Pfeiffer.

* *Unio elongatula* C. PFEIFFER,[2] Nat. Deuts., L. and S. Moll., II, 1825, p. 35, pl. VIII, figs. 5, 6.—ROSSMASSLER, Icon., II, 1835, p. 23, pl. IX, fig. 132; XII, 1844, p. 27, pl. LVI, fig. 751; VI, 1879, p. 42, pl. CLXII, figs. 1644, 1645.—PORRO, Mal. Como, 1838, p. 114.—CATLOW and REEVE, Conch. Nom., 1845, p. 59.—KUSTER, Conch. Cab. Unio., 1854, p. 104, pl. XXVIII, figs. 4, 5.—DROUET, Nay Fr., II, 1857, p. 91, pl. VI, fig. 2.—H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXV, fig. 451.—DROUET, J. de Conch., XXVII, 1879, p. 331.—* CLESSIN, Moll. Oest., 1887, p. 735.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 163.—* PÆTEL, Conch. Sam., III, 1890, p. 151.—* LOCARD, Coq. de Fr., 1893, p. 166, fig. 180.

* *Margarita* (*Unio*) *elongatulus* LEA, Syn., 1836, 1838, p. 24.

* *Margaron* (*Unio*) *elongatulus* LEA, Syn., 1852, p. 37, 1870, p. 59.

Central Europe.

†UNIO TUMIDUS Retzius.

* *Unio tumidus* RETZIUS, Diss. Hist. Nat., 1778, p. 17.—SPENGLER, Skriv. Selsk. Nat., III, 1793, p. 57.—NILSSON, Hist. Moll. Svec., 1822, p. 109.—ROSSMASSLER, Icon., I, 1835, p. 117, pl. III, figs. 70, 70*a*, 70*b*; III, 1836, p. 27, pl. XIV, figs. 202–204; VIII, 1838, p. 41, pl. XL, fig. 543; XII, 1844, p. 32, pl. LX, figs. 772–778.[3]—* BROWN, L. and F. W. Conch., 1836, p. 109, pl. XXI, figs. 8, 9.—* HANLEY, Test. Moll., 1842, p. 205; * Biv. Shells, 1843, p. 205.—* BROWN, Ill. Rec. Conch., 1844, p. 82, pl. XXXII, figs. 5–8.—* CATLOW and REEVE, Conch. Nom., 1845, p. 65.—* STABILE, Faun. Lug., 1845, p. 61, pl. III, fig. 74.—* STEIN, Die Leb. Schnecken, 1850, p. 103.—* DUPUY, Hist. Moll. Fr., 1852, p. 655, pl. XXVIII, fig. 20.—* FORBES and HANLEY, Hist. Brit. Moll., II, 1853, p. 140, pl. XL, fig. 1.—* KUSTER, Conch. Cab. Unio, 1854, p. 71, pls. XVII, XVIII.—* MOQUIN-TANDON, Moll. Terr. Fluv., II. 1855, p. 577, pl. LI, figs. 11, 14.—* VON WAHL, Arch. für Naturkunde Liv., 2d ser., I, p. 115.—* NORDENSKIÖLD and NYLANDER, Fin. Moll., 1856, p. 85, pl. VI, figs. 7, 8.—* GRAY, Turton's Man., 1857, p. 297.—* DROUET, Nay. Fr., II, 1857, p. 110, pl. IX, fig. 2.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—* SOWERBY, Ill. Int. British Shells, 1859, pl. VII, No. 3.—* JEFFREYS, Brit. Conch., I, 1862, p. 32.—* REEVE, L. and F. W. Moll. Brit., 1863, p. 219, fig. 1.—* REEVE, Conch. Icon., XVI, 1865, pl.

[1] Credited by Lea to the above without page reference. I have not seen the paper.

[2] Pfeiffer credits this to Muhlfeld in *litt.* It is a doubtful species, perhaps a variety of *pictorum*, but is generally smaller, thinner, and more compressed, and is rather more biangulate behind. Pfeiffer's two figures represent somewhat different forms, but they may be the same thing.

[3] Fig. 776 is probably a form of *batavus*.

XXV, fig. 124.—* TATE, L. and F. W. Moll. Brit., 1866, pl. II, fig. 2.—* KOBELT, Faun. Nass. Moll., 1871, p. 239.—* LEHMAN, Die Schnecken, 1873, p. 292.—* WESTERLUND, Faun. S. N. and D., 1873, p. 572.—* CLESSIN, Dents. Ex. Moll, 1876, p. 458, fig. 299.—* JORDAN, Jahrb. Dents. Mal. Ges., VI, 1879, p. 305.—* DROUET, Union. Russ., 1881, p. 9; * Mem. Ac. Dijon, 3d ser., VII, 1882, p. 12 (reprint).—* L. ADAMS, Coll. Man., 1884, p. 18, pl. L, fig. 10.—* CLESSIN, Moll. Oest., 1887, p. 738.—* P.ETEL, Conch. Sam., III, 1890, p. 170.—* KOBELT, Icon., new ed., VI, 1893, p. 87, pl. CLXXIII, fig. 1115.—* LOCARD, Coq. Fr., 1893, p. 212.—* WESTERLUND, Act. Soc. F. and F. F., XIII, 1897, p. 162.

* *Margaron* (*Unio*) *tumidus* LEA, Syn., 1852. p. 36; 1870, p. 58.

* *Unio tumida* C. PFEIFFER, Nat. Dents. L. and S. Moll., II, 1825, p. 34, pl. VII, figs. 2, 3; pl. VIII, figs. 1, 2.—* KLEEBERG, Moll. Bor., 1828, p. 38.—* PUTON, Moll. Vosges, 1847, p. 71.

* *Mya depressa* DONOVAN, Brit. Shells, III, 1801, pl. CI.—* CHENU, Bib. Conch., 1st Ser., I, 1845, p. 71, pl. XXVI, figs. 1–3.

* *Unio depressus* P.ETEL, Conch. Sam., III, 1890, p. 150.

* *Mya orata* DONOVAN, Brit. Shells, IV, 1802, pl. CXXII.[1]—* MATON and RACKETT, Tr. Linn. Soc. Lond., VIII, 1807, p. 39.—* WOOD, Gen. Conch., I, 1815, p. 105, pl. XIX, fig. 5.—* DILLWYN, Cat., I, 1817, p. 50.—? TURTON, Conch. Dict., 1819, p. 106.—* WOOD, Ind. Test., 1825, p. 12, pl. II, fig. 27e; * rev. ed., 1856, p. 16, pl. II, fig. 27.—* CHENU, Bib. Conch., 1st ser., I, 1845, p. 82, pl. XXXII, figs. 1–3.

* *Mysca orata* TURTON, Conch. Ins. Brit., 1822, p. 246; Man. Shells Brit. Is., 1831, p. 21, fig. 12.—* SWAINSON, Treat. on Mal., 1840, p. 277, fig. 56.

* *Mysca solida* TURTON, Conch. Ins. Brit., 1822, p. 246, pl. XVI, fig. 2; Man. Shells Brit. Is., 1831, p. 22, fig. 13.

* *Mya ovalis* MONTAGU, Test. Brit., 1803, p. 34.—* FLEMING, Hist. Br. Anim., 1828, p. 416.

* *Unio oralis* BROWN, L. and F. W. Conch., 1836, p. 101, pl. XVIII, figs, 4, 5; Ill. Rec. Conch., 1844, p. 82, pl. XXXI, figs. 12–14.—* LEACH, Syn. Moll. Gt. Br., 1852, p. 322.

* *Margarita* (*Unio*) *ovalis* LEA, Syn., 1836, p. 35; 1838, p. 24 .

* *Unio muelleri* ROSSMASSLER, Icon., VIII, 1838, p. 41, pl. XL, fig. 541; XI, 1842, p. 13, pl. LIV, fig. 739.

* *Unio pictorum* BROWN, Ill. Rec. Conch., 1844, p. 81, pl. XXXI, figs. 8–11.

Northern and middle Europe; eastern Siberia.

UNIO TURTONI Payraudeau.

* *Unio turtoni* PAYRAUDEAU, Cat. Moll. Corse, 1826, p. 65, pl. II, fig. 65.[2]—* PHILIPPI, Moll. Sic., 1836, p. 67.—* ROSSMASSLER, Icon., VII, 1838, p. 25, pl. XXXV, fig. 492.—* CATLOW and REEVE, Conch. Nom., 1845, p. 65.—* REQUIEN, Cat. Coq. Corse, 1848, p. 29.—* DUPUY, Hist. Moll. Franc., 1852, p. 651, pl. XXVII, fig. 17.—* PAULLUCCI, Bull. Soc. Mal. It., V, 1879, p. 107.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 160.—* P.ETEL, Conch. Sam., III, 1890, p. 170.

* *Unio capigliolo* PAYRAUDEAU, Cat. Moll. Corse, 1826, p. 66, pl. II, fig. 4.—* ROSSMASSLER, Icon., V and VI, 1837, p. 22, pl. XXIV, fig. 341; XII, 1844, p. 28, pl. LVII, figs. 755, 756.—* MOQUIN-TANDON, Moll. Terr. Fluv. Fr., II, 1855, p. 574, pl. L, figs. 3, 4.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 146.—* P.ETEL, Conch. Sam., III, 1890, p. 147.

* *Unio capigliolo* var. *bondini* P.ETEL, Conch. Sam., III, 1890, p. 147.

[1] First described by Lister in Historia Animalium Angliæ, 1678.

[2] This has often been confounded with *U. pictorum*, but is generally more rhomboid, higher at the posterior part of the ligament, and more plainly marked at the rest periods than that species.

**Unio pictorum* GUERIN, Icon. Règne Anim., II, 1829–1844, pl. XXVIII, fig. 16.—* BOURGUIGNAT, Mal. Alg., II, 1864, p. 292, pl. XXII, figs. 6–11.—* REEVE, Conch. Icon., XVI, 1865, pl. XXV, fig. 123.

**Unio requienii* MICHAUD, Comp. Hist. Nat. Moll. Fr., 1831, p. 106, pl. XVI, fig. 24.—* ROSSMASSLER, Icon., III, 1836, p. 24, pl. XIII, fig. 198.—* GRAS, Moll. Isere, 1840, p. 21.—* STABILE, Faun. Lug., 1845, p. 62, pl. III, fig. 1786.—* GASSIES, Moll. Agen., 1849, p. 195, pl. I, figs. 4, 5.—* DUPUY, Hist. M. Fr., 1852, p. 652, pl. XXVII, fig. 18.—* KUSTER, Conch. Cab. Unio, 1854, p. 126, pl. XXI, fig. 7; XXVI, figs. 1–3; XXXVII, figs. 2–4.—* DROUET, Nay. Fr., II, 1857, p. 93, pl. VII, figs. 1–3.—* MOUSSON, Coq. Terr. Fluv. Pal., 1861, p. 66.—* DROUET, Moll. Côte d'Or, 1867, p. 102.—* BENOIT, Mus. Cat. Sic., 1881, p. 170.—* CLESSIN, Moll. Oest., 1887, p. 731, fig. 494.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 121.—* PÆTEL, Conch. Sam., III, 1890, p. 165.

**Unio lobata* PHILIPPI, Moll. Sic., 1836, p. 67.

**Unio bandanii* ROSSMASSLER, Icon., V, 1837, p. 22, pl. XXIV, fig. 341.

**Unio pallens* ROSSMASSLER, Icon., XI, 1849, p. 13, pl. LIV, fig. 740.[1]—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 114.

**Unio hispanus* ROSSMASSLER, Icon., XII, 1844, p. 26, pl. LVI, fig. 747.—* BOURGUIGNAT, Moll. Peu. Con., 1863, p. 46, pl. XXIV, figs. 1–3.—* BOURGUIGNAT, Rev. et Mag., XVII, 1865, p. 344, pl. XXIII, figs. 1–3.—* PÆTEL, Conch. Sam., III, 1890, p. 155.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 139.

**Unio alcroni* COMPANYO and MASSOT, Bull. Soc. Pyr. d'Or, VI, Pt. 2, 1845, p. 234, fig. .—* BOURGUIGNAT, Moll. Peu. Con., 1863, p. 49, pl. XXIII, figs. 1–3; Rev. et Mag., XVII, 1865, pl. XIX, figs. 1–3.

**Unio rousii* DUPUY, Hist. Moll., VI, 1852, p. 653, pl. XVIII, fig. 18.—* MUSGRAVE, Phot. Conch., 1863, pl. II, fig. 7.

**Unio valentinus* ROSSMASSLER, Icon., III, 1854, p. 37, pl. LXIX, p. 852.—* BOURGUIGNAT, Moll. Peu. Con., 1863, p. 45, pl. XXVII; Rev. et Mag. Zool., XVII, 1865, p. 343, pl. XX.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 140.—* PÆTEL, Conch. Sam., III, 1890, p. 171.

* *Margaron* (*Unio*) *valentinus* LEA, Syn., 1870, p. 52.

* *Unio ardusianus* MOQUIN-TANDON, Hist. Moll. Fr., II, 1855, p. 575.[2]—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 109.—* LOCARD, Coq. de Franc., 1893, p. 205.

* *Unio gracilsianus* BOURGUIGNAT, Moll. Peu. Con., 1863, p. 47, pl. XXIII, figs. 4–7; * Rev. et Mag., 1865, p. 345, pl. XIX, figs. 4–7.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 140.

* ?*Unio letourneuxi* BOURGUIGNAT, Mal. Alg., 1864, p. 289, pl. XVII, fig. 47.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 58.—* PÆTEL, Conch. Sam., III, 1890, p. 157.

* *Unio courquinianus* BOURGUIGNAT, Moll. Peu. Con., 1863, p. 48; * part, Rev. et Mag., 1865, p. 346, pl. XXII, figs. 1, 2.

* *Unio siculus* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXI, fig. 364.[3]

* *Unio ravoisieri* var. *issericus* KOBELT, Icon., new ser., I, 1884, p. 65, pl. XXVIII, fig. 215.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 142.

* *Unio alexandri* KOBELT, Icon., 1st sup., 1895, p. 14, pl. II, fig. 2.

Entire circummediterranean region.

[1] Credited by Rossmassler to Parreyss. I do not know where the latter described it or whether he described it at all.

[2] Moquin-Tandon credits this to a letter from Reynies, 1843, and gives a reference to p. 5, pl. I, figs. 6, 7, of the letter. I do not know that this was ever published. He makes it a variety of *requienii*.

[3] This is *Potamida sicula* Swainson according to Sowerby. I refer Swainson's shell to *Unio pictorum*.

†UNIO RAVOISIERI Deshayes.[1]

**Unio ravoisieri* DESHAYES, Hist. Nat. Moll. Acceph. Alg., 1848, pl. CVIII, figs. 4–7.[2]—*BOURGUIGNAT, Mal. Alg., 1861, p. 291, pl. XX, figs. 5–10.—*P.ETEL, Conch. Sam., III, 1890, p. 165.—*WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 142.

**Margaron* (*Unio*) *ravoisieri* LEA, Syn., 1870, p. 48.

**Unio moreleti* DESHAYES, Hist. Moll. Alg., 1848, pl. CIX, figs. 1–4; CXII, fig. 5.—*KOBELT, Icon., new ser., II, 1886, p. 4, pl. XXXIII, fig. 228.—*WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 141.—*P.ETEL, Conch. Sam., III, 1890, p. 160.

**Margaron* (*Unio*) *moreleti* LEA, Syn., 1870, p. 60.

*?*Unio maccarthyanus* BOURGUIGNAT, Moll. Peu. Con., 1886, p. 221, pl. XXXIV, figs. 8–11.—*WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 57.—*P.ETEL, Conch. Sam., III, 1890, p. 158.

Algiers.

†UNIO MUSSOLIANUS Kuster.

**Unio mussolianus* KUSTER, Conch. Cab. Unio, 1861, p. 244, pl. LXXXII, fig. 1.[3]—*P.ETEL, Conch. Sam., III, 1890, p. 160.

**Unio bourguignatianus* LEA, Pr. Ac. N. Sci. Phila., VII, 1863, p. 189; *Jl. Ac. N. Sci. Phila., VI, 1866, p. 54, pl. XVIII, fig. 51; *Obs., XI, 1867, p. 55, pl. XVIII, fig. 51.—*WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 178.—*P.ETEL, Conch. Sam., III, 1890, p. 146.

**Margaron* (*Unio*) *bourguignatianus* LEA, Syn., 1870, p. 39.

**Unio rasus* LEA, Pr. Ac. N. Sci. Phila., VII, 1863, p. 189; *Jl. Acad. N. Sci. Phila., VI, 1866, p. 50, pl. XVII, fig. 47; *Obs., XI, 1867, p. 54, pl. XVII, fig. 47.—*P.ETEL, Conch. Sam., III, 1890, p. 165.

**Margaron* (*Unio*) *rasus* LEA, Syn., 1870, p. 58.

**Unio mosulensis* LEA, Pr. Acad. N. Sci. Phila., VII, 1863, p. 190; *Jl. Acad. N. Sci. Phila., VI, 1866, p. 52, pl. XVII, fig. 49; *Obs., XI, 1867, p. 56, pl. XVII, fig. 49.

**Margaron* (*Unio*) *mosulensis* LEA, Syn., 1870, p. 48.

**Margaritana mosulensis* P.ETEL, Conch. Sam., III, 1890, p. 173.

Assyria.

UNIO HUETI Bourguignat.

**Unio hueti* BOURGUIGNAT, Rev. et Mag., VII, 1855, p. 332, pl. VIII, figs. 1–4.—VON MARTENS, Vorderas. Conch., 1874, p. 35, pl. VII, fig. 54.—*P.ETEL, Conch. Sam., III, 1890, p. 155.—*WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 171.[4]

Asia Minor.

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[1] Doubtfully distinct from *U. turtoni*. It is not quite so rhomboid as that species, which is also found in Algiers, but I have seen much intermediate material which hints at a connection of the two.

[2] The magnificent work in which this species with other Unionæ was figured was never finished, and no descriptions of the *Naiades* were written. The beautiful colored figures are wonderfully characteristic and are accompanied by names.

[3] Credited to Parreyss in catalogue.

[4] This is quite likely only a variety of the preceding, but seems to be thinner and is more evenly elliptical. Von Martens believes it to be the same as Lea's *mosulensis*.

UNIO EUCIRRUS Bourguignat.

* *Unio eucirrus* BOURGUIGNAT, Mag. Zool., IX, 1857, p. 20, pl. VIII, figs. 4-6.—* KOBELT, Icon., VII, 1880, p. 82, pl. CCVI, fig. 2101.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 171.—* PÆTEL, Conch. Sam., III, 1890, p. 152.

* *Margaron* (*Unio*) *eucirrus* LEA, Syn., 1870, p. 46.

Asia Minor. Probably a form of *hueti*.

† UNIO TIGRIDIS Bourguignat.[1]

* *Unio truncatus* SWAINSON, Zool. Ill., 2d ser., I, 1829, pl. X.—* HANLEY, Test. Moll., 1842, p. 187; * Biv. Shells., 1843, p. 187.—* CATLOW and REEVE, Conch. Nom., 1845, p. 64.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 496.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXV, fig. 453.

* *Margarita* (*Unio*) *truncatus* LEA., Syn., 1836, p. 21; 1838, p. 18.

* *Margaron* (*Unio*) *truncatus* LEA, Syn., 1852, p. 26; 1870, p. 39.

* *Unio tigridis* BOURGUIGNAT, Test. Nov. Saul., 1852, p. 30; * Cat. Rais. Moll., 1853, p. 77, pl. IV, figs. 7-9.—* KUSTER, Conch. Cab. Unio, 1861, p. 227, pl. LXXVII, fig. 1.—* KOBELT, Icon., new ser., II, 1886, p. 2, pl. XXXII, fig. 226.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 175.—* PÆTEL, Conch. Sam., III, 1890, p. 169.

* *Unio dignatus* LEA, Pr. Ac. N. Sci. Phila., VII, 1863, p. 189; * Jl. Acad. N. Sci. Phila., VI, 1866, p. 51, pl. XVII, fig. 48; * Obs., XI, 1867, p. 55, pl. XVII, fig. 48.—* PÆTEL, Conch. Sam., III, 1890, p. 150.

* *Margaron* (*Unio*) *dignatus* LEA, Syn., 1870, p. 39.

* *Margaron* (*Unio*) *tigris* LEA, Syn., 1870, p. 39.

Unio tigris FERUSSAC, manuscript.[2]

* ? *Unio kisonis* KOBELT, Icon., 1st sup., 1895, p. 17, pl. VII, figs. 2, 3.[3]

Asia Minor; Assyria.

UNIO PIETRI Locard.

* *Unio pietri* LOCARD, Comptes Rendus, XCI, 1880, p. 500; * Arch. Mus. Lyon, III, 1883, p. 210, pl. XX, figs. 17-19.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 170.

* *Unio petroi* PÆTEL, Conch. Sam., III, 1890, p. 163.

* *Unio lorteti* LOCARD, Comptes Rendus, XCI, 1880, p. 502; * Arch. Mus. Lyon, III, 1883, p. 215, pl. XXI, figs. 7-12.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 173.

* *Unio tristrami* LOCARD, Arch. Mus. Lyon, III, 1883, p. 209, pl. XX, figs. 15, 16.—* PÆTEL, Conch. Sam., III, 1890, p. 170.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 170.

* *Unio tiberiadensis* LOCARD, Arch. Mus. Lyon, III, 1883, p. 216, pl. XXI, figs. 13-15.—* PÆTEL, Conch. Sam., III, 1890, p. 169.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 174.

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[1] Swainson gave the name *Unio truncatus* to this species in 1829, but that name had been applied to a *Unio* by Spengler in 1793. Bourguignat credits this to Ferussac manuscript under the name of *Unio tigris*.

[2] Lea credits this to Ferussac manuscript in museum at Paris. No description has ever been published, so far as I know, though several authors have cited it and credited it to Ferussac. A specimen in the Lea collection which is no doubt authentic is apparently a delicate young *tigridis*.

[3] Young shells, and it is very hard to say whether they are *tigridis* or *terminalis*.

* *Unio prosacrus* LOCARD, Arch. Mus. Lyon, III, 1883, p. 219, pl. XXI, figs. 16, 17.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 174.

* *Unio axiacus* LOCARD, Arch. Mus. Lyon, III, 1883, p. 242, pl. XX, figs. 20–23.—* PÆTEL, Conch. Sam., III, 1890, p. 145.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 170.

* *Unio subtigridis* LOCARD, Arch. Mus. Lyon, III, 1883, p. 245, pl. XXI, figs. 18–20.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 175.—* PÆTEL, Conch. Sam., III, 1890, p. 168.

* *Unio aremprosthus* LOCARD, Arch. Mus. Lyon, III, 1883, p. 246, pl. XXI, figs. 21–23.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 175.

* *Unio chantri* LOCARD, Arch. Mus. Lyon, III, 1883, p. 247, pl. XXII, figs. 1–7.—* PÆTEL, Conch. Sam., III, 1890, p. 147.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 176. [1]

Asia Minor.

UNIO ZABULONICUS Locard.

* *Unio zabulonicus* LOCARD, Arch. Mus. Lyon, III, 1883, p. 220, pl. XXII, figs. 11–18.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 177.—* PÆTEL, Conch. Sam., III, 1890, p. 172.

* *Unio antiochianus* LOCARD, Arch. Mus. Lyon, III, 1883, p. 249, pl. XXII, figs. 14–16.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 176.

Asia Minor.

† UNIO TERMINALIS Bourguignat.

* *Unio terminalis* BOURGUIGNAT, Test. Novias., 1852, p. 31; * Cat. Rais. Moll., 1853, p. 76, pl. III, figs. 4–6; * Jl. de Conch., IV, 1853, p. 74, pl. III, figs. 10′ 10″.—* MOUSSON, Coq. Terr. et Fluv. Pal., 1861, p. 65.—* KOBELT, Icon., IV, 1876, p. 65, pl. CXIX, fig. 115.—* PÆTEL, Conch. Sam., III, 1890, p. 169.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 174.

* *Margaron* (*Unio*) *terminalis* LEA, Syn., 1870, p. 39.

Lake Tiberias.

UNIO GRELLOISIANUS Bourguignat.

* *Unio grelloisianus* BOURGUIGNAT, Rev. et Mag., VIII, 1856, p. 227, pl. XL, figs. 1–4; Moll. Peu. Con., 1863, p. 74, pl. XXIII, figs. 4–7.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, pp. 140, 173.—* PÆTEL, Conch. Sam., III, 1890, p. 154.

* *Unio lunulifer* BOURGUIGNAT, Rev. et Mag., VIII, 1856, p. 227, pl. XI, figs. 5–8.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 177.—* PÆTEL, Conch. Sam., III, 1890, p. 158.

* *Margaron* (*Unio*) *lunulifer* LEA, Syn., 1870, p. 37.

* *Unio jordanicus* BOURGUIGNAT, Rev. et Mag., VIII, 1856, p. 228, pl. X, figs. 1–4.—* MOUSSON, Coq. Terr. Fluv. Pal., 1861, p. 66.—* PÆTEL, Conch. Sam., III, 1890, p. 156.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 172.

* *Margaron* (*Unio*) *jordanicus* LEA, Syn., 1870, p. 44.

Jordon River.

[1] All these so-called species of Locard, some of which he credits to the manuscripts of Bourguignat and Lortet, have high beaks placed at some distance from the anterior end, are wedge-shaped and more or less pointed posteriorly. I think it quite probable that all of them, together with the next species, are mere variations of Bourguignat's old *U. terminalis*. Of course Locard has figured every possible variation and distortion and called it a species.

UNIO ELLIPSOIDEUS Locard.

* *Unio ellipsoideus* LOCARD, Arch. Mus. Lyon., III, 1883, p. 211, pl. XXI, figs. 1–3.[1]—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 171.—* PÆTEL, Conch. Sam., III, 1890, p. 151.

* *Unio genezarethensis* LOCARD, Arch. Mus. Lyon., III, 1883, p. 213, pl. XXI, figs. 4–6.—* PÆTEL, Conch. Sam., III, 1890, p. 153.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 172.

* *Unio jauberti* LOCARD, Arch. Mus. Lyon., III, 1883, p. 248, pl. XXII, figs. 8–10.—* PÆTEL, Conch. Sam., III, 1890, p. 155.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 176.

* *Unio zabulonicus* KOBELT, Icon., new ser., VI, 1893, p. 96, pl. CLXXIX, fig. 1129.

* *Unio lortiti* KOBELT, Icon., 1st sup., 1895, p. 14, pl. V, fig. 3.

* *Unio kobelti* ROLLE, Icon., 1st sup., 1895, p. 15, pl. VI. fig. 3.

* *Unio pietri* KOBELT (part), Icon., 1st sup., 1895, p. 16, pl. VI, figs. 1, 2.

* *Unio herodes* KOBELT, Icon., 1st sup., 1895, p. 17, pl. VI, fig. 4.

Lake Tiberias.

†UNIO DELICATUS Lea.[2]

* *Unio delicatus* LEA, Pr. Acad. N. Sci. Phila., VII, 1863, p. 189.—* Jl. Acad. N. Sci. Phila., VI, 1866, p. 58, pl. XIX, fig. 56.—* Obs., XI, 1867, p. 62, pl. XIX, fig. 56.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 178.—* PÆTEL, Conch. Sam., III, 1890, p. 150.

* *Margaron* (*Unio*) *delicatus* LEA, Syn., 1870, p. 42.

Orontes River, Syria.

(Group of *Unio littoralis*.)

Shell rather solid, subinflated, rounded rhomboid, with a faint posterior ridge, usually slightly biangulate behind and often becoming arcuate when old; beaks prominent and full; beak sculpture consisting of numerous rather fine, subparallel ridges or corrugations which are sometimes a good deal broken up, and which extend well out on the disk, but begin at the beaks as normal, somewhat coarse *Unio* sculpture, sometimes with fine radial lines posteriorly; pseudocardinals rather solid, subcompressed, smooth below; laterals straight or slightly curved; cavity of the beaks rather deep; muscle scars distinct.

I have never seen the soft parts of any member of this group. Quite a number of descriptions have been published of various nominal species, most of which go into details as to the color of the different parts, but do not give an atom of information as to real characters. The animal is dark or highly colored, and seems to be gravid in summer, and no doubt carries the young in the outer gills alone. Gills large, wider behind, inner the larger, especially in front; mantle thickened at the edges; palpi very large, elliptical, rounded behind, hanging at an angle of 45°; branchial opening large, strongly fringed.[3]

[1] I think this is a form of *grelloisianus*. Some forms of the latter are very much like *U. tigridus* Bourguignat, but he says that it has roughened beaks while those of *tigridis* are always smooth.

[2] I have only seen the type, a young shell, and its relations are doubtful. The sharp, rather pustulous, beak sculpture, and the shining, yellowish epidermis are like the *pictorum* group, but its form is peculiar. It may not come from Syria at all.

[3] From a figure in Mal. d'Algérie, II, pl. XIX.

†UNIO LITTORALIS Lamarck.[1]

* *Unio littoralis* LAMARCK, Syst. An. sans Vert., 1801, p. 114.—* DRAPARNAUD, Tab. Moll. Fr., 1801, p. 101; *Hist. Moll. Fr., 1806, p. 135, pl. X, fig. 20.—*MILLET, Moll. Maine et Loire, 1813, p. 74.—* BRARD, Hist. Coq., 1815, p. 229.—*CUVIER, Règne Animal, II, 1817, p. 473.—*LAMARCK, An. sans Vert., VI, 1819, p. 76.*—DESHAYES, Enc. Méthod., II, 1827, p. 151, pl. CCXLVIII, fig. 2.—*MICHAUD, Comp. Hist. Moll. Fr., 1831, p. 110.—*LEA, Obs., I, 1834, p. 201.—*GOUPIL, Hist. Moll. Sarthe. 1835, p. 83.—*PHILIPPI, Moll. Sic., 1836, p. 66.—*ROSSMASSLER, Icon., V, 1837, p. 21, pl. XXIV, fig. 340.—*TERVER, Cat. Moll. Terr. et Fluv., 1839, p. 39.—*SOWERBY, Conch. Man., 1839, fig. 145.—*GRAS, Moll. Isere., 1840, p. 72, pl. V, fig. 20.—*HANLEY, Test. Moll., 1842, p. 201; *Biv. Shells, 1843, p. 201, pl. XXI, fig. 13.—*CATLOW and REEVE, Conch. Nom., 1845, p. 60.—*PUTON, Moll. Vosges., 1847, p. 74.—*GASSIES, Moll. Agenais, 1849, p. 197.—*DUPUY, Hist. Moll. Fr., 1852, p. 632, pl. XXIII, fig. 8; XXIV, figs. 5, 6, 8.—*ROSSMASSLER, Icon., III, 1854, p. 37, pl. LXIX, fig. 850.—*DROUET, Nay. Fr., II, 1857, p. 66, pl. III, figs. 1, 2.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—*MOUSSON, Coq. Terr. Fluv. Pal., 1861, p. 64.—*REEVE, Conch. Icon., XVI, 1865, pl. XXII, fig. 98.—*WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 52.—*P.ETEL, Conch. Sam., III, 1890, p. 157.

* *Unio littoralis* var. *minor* ROSSMASSLER (part), Icon., XI, 1842, p. 14, pl. LV, figs. 743, ? 747.[2]

* *Unio littoralis* var. *acarranicus* KOBELT, Icon., IV, 1879, p. 40, pl. CLXI, fig. 1638.

* *Unio littoralis* var. *pianensis* KOBELT, Icon., VI, 1888, p. 43, pl. CLXIII, fig. 1648.

* *Margarita* (*Unio*) *litoralis* LEA, Syn., 1836, p. 32; 1838, p. 22.

* *Margaron* (*Unio*) *litoralis* LEA, Syn., 1852, p. 34; 1870, p. 54.

* *Unio litoralis* var. *umbonatus* ROSSMASSLER, Icon., XII, 1844, p. 27, pl. LVI, fig. 754.

* *?Unio granosus* SCHUMACHER, Ess. Nouv. Syst., 1817, pl. II, fig. 1.[3]

* *Unio brevialis* LAMARCK, An. sans Vert., VI, 1819, p. 73.—* LEA, Obs., I, 1834, p. 200.[4]

* *Unio naza* LAMARCK, An. sans Vert. VI, 1819, p. 76.—* LEA, Obs., I, 1834, p. 202.—*CATLOW and REEVE, Conch. Nom., 1845, p. 61.—*WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 83.

* *Unio rubens* MENKE, Syn., 1830, p. 149.—* ROSSMASSLER, Icon., V and VI, 1837, p. 56, pl. XXIX, fig. 412.

* *Unio subtetragona* MICHAUD, Comp. Hist. Moll. Fr., 1831, p. 111.—* GRAS, Moll. Isere., 1840, p. 21.

* *Unio subtetragonus* CATLOW and REEVE, Conch. Nom., 1845, p. 64.—* DUPUY, Hist. Moll. Fr., 1852, p. 634, pl. XXIV, fig. 7.

[1] Lamarck refers this in the Animaux sans Vertébres first to his Système An. sans Vertébres, published in 1801, and thirdly to Draparnaud (Hist. Moll. Fr., 1806). Draparnaud published this species under the name *Unio littoralis* without a figure in the Tableau Mollusques de France, 1801, which appeared, according to Moquin-Tandon, about July 1 of that year. I do not know which has priority, but Lamarck refers to a characteristic figure in the Encyclopédie Méthodique (1797), thus fixing the species without a doubt, and as he is most generally considered its author I shall credit it to him.

[2] Fig. 743 is a small *U. littoralis*. I think 747 is *U. batavus*.

[3] Only a partial inside view is given of two valves. Schumacher says it very much resembles *U. corrugatus* Retzius, but is larger, and the teeth are very different. I believe it is a *U. littoralis*.

[4] Lamarck refers this species to the Isle of France. Sganzin states (Mém. Soc. Hist. Nat. Strasb., 1840–46, p. 8) that the amateurs he consulted in that island assured him that no such mollusk was found there. According to Lea it is *Unio littoralis*.

* *Unio incurvus* LEA, Tr. Am. Phil. Soc., IV, 1831, p. 97, pl. XIII, fig. 27; * Obs., I, 1834, p. 107, pl. XIII, fig. 27.—* CHENU, Ill. Conch., 1858, pl. XI, figs. 1, 1*a*, 1*b*.

Unio draparnaldi DESHAYES, Desc. Coq. Terr., 1831, p. 38, pl. XIV, fig. 6.—† P.ETEL, Conch. Sam., III, 1890, p. 151.

* *Unio pianensis* FARINES, Ann. des Sci. Nat., II, 1834, p. 118.—* MÖLLER, Syn. Nov. Gen., 1836, p. 197.—* DUPUY, Hist. Moll. Fr., 1852, p. 635, pl. XXIV, fig. 4.

* *Unio bigerrensis* MILLET, Guer. Mag., 1843, p. 3, pl. LXIV, fig. 1.

* *Unio bigorrensis* LOCARD, Coq. de Franc., 1893, p. 153.

* *Unio fellmani* DESHAYES, Hist. Nat. Moll. Alg., 1848, pl. CVIII, figs. 8, 9.—* KUSTER, Conch. Cab., 1856, p. 151, pl. XLIV, fig. 1.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—* P.ETEL, Conch. Sam., III, 1890, p. 152.

* *Margaron* (*Unio*) *fellmani* LEA, Syn., 1870, p. 46.

* *Unio barrandii* DUPUY, Hist. Moll. Fr., 1852, p. 635, pl. XXV, fig. 1.

* *Unio astierianus* DUPUY, Hist. Moll. Fr., 1852, p. 636, pl. XXIII, fig. 9.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXVI; fig. 461.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 53.—* LOCARD, Coq. de Franc., 1893, p. 153.

* *Unio cuneatus* ROSSMASSLER, Icon., XIII and XIV, 1854, p. 37, pl. LXIX, fig. 851.—* P.ETEL, Conch. Sam., III, 1890, p. 149.

* *Unio rhomboideus* MOQUIN-TANDON, Moll. Terr. Fluv. Fr., II, 1855, p. 568, pl. XLVIII, figs. 4, 9; XLIX, figs. 1, 2.—* BOURGUIGNAT, Mal. Alg., 1864, II, p. 284, pl. XVIII; Rev. et Mag., XVIII, 1866, p. 11.—* LOCARD, Coq. de Franc., 1893, p. 152, fig. 165.

* *Unio rothi* BOURGUIGNAT, Moll. Nouv., 1863, p. 41, pl. XX, figs. 1–6; Rev. et Mag., XVII, 1865, p. 337, pl. XVI.—* KOBELT, Icon., VI, 1879, p. 40, pl. CLXI, fig. 1639.—* P.ETEL, Conch. Sam., III, 1890, p. 166.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 59.

* *Unio umbonatus* BOURGUIGNAT, Moll. Nouv., 1863, p. 42, pls. XXI, XXII; * Rev. et Mag., XVII, 1865, p. 339, pls. XVII, XVIII.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 54.

* *Unio subreniformis* BOURGUIGNAT, Moll. Nouv., 1863, p. 43; Rev. et Mag., XVII, 1865, p. 340.—* KOBELT, Icon., IV, 1876, p. 64, pl. CXVIII, fig. 1151.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 54.

* *Unio ater* REEVE, Conch. Icon., XVI, 1865, pl. XXI, fig. 19.

* *Unio crassus* REEVE, Conch. Icon., XVI, 1865, pl. XXII, fig. 98.

* *Unio valentinus* SOWERBY, Conch. Icon., XVI, 1866, pl. XLI, fig. 225.

* *Unio mauritanicus* BOURGUIGNAT, Moll. Nouv., 1868, p. 317, pl. XLV, figs. 1–5.—* KOBELT, Icon., II, new ser., 1886, p. 5, pl. XXXIII, fig. 230.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 56.

* *Unio ksibianus* MOUSSON, Mal. Blatt., XXI, 1873, p. 156; * Jahrb. Deuts. Mal. Ges., I, 1874, p. 104, pl. V, fig. 6.—* KOBELT, Icon., IV, new ser., 1876, p. 65, pl. CXIX, fig. 1153.—* P.ETEL, Conch. Sam., III, 1890, p. 156.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890.

* *Unio jolyi* KOBELT, Icon., new ser., II, 1886, p. 22, pl. XLI, fig. 256.—* P.ETEL, Conch. Sam., III, 1890, p. 156.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 57.

* *Unio maccarthyanus* KOBELT, Icon., new ser., II, 1886, p. 5, pl. XXXIII, fig. 229.

* *Unio letourneauxi* KOBELT, Icon., new ser.,, II, 1886, p. 3, pl. XXXII, fig. 227.

* *Unio lycicus* ROLLE, Icon., 1st sup., 1895, p. 18, pl. II, fig. 1.

Southern Europe; Asia Minor; Assyria; Morocco; Algiers.

†UNIO DELESSERTI Bourguignat.[1]

Unio delesserti BOURGUIGNAT, Voy. Mer. Mort., 1852, p. 77; Test. Nov. Saul., 1852, p. 29; * Cat. Rais. Moll., 1853, p. 77, pl. III, figs. 7–9.—* ROTH, Mal. Blatt., 1856,

[1] Approaches *U. littoralis*, and may be only a variety of that, but is not so elongated.

II, p. 57.—* PÆTEL, Conch. Sam., III, 1890, p. 150.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 172.

* *Margaron (Unio) delesserti* LEA, Syn., 1870, p. 46.

Syria.

†UNIO SEMIRUGATUS Lamarck.[1]

* *Unio semirugatus* LAMARCK, An. san. Vert., VI. 1819, p. 76.—* DELESSERT, Rec. Coq. Lam., 1841, pl. XII, figs. 6, 6*a*, 6*b*.

*† *Unio emesaensis* LEA, Pr. Acad. N. Sci. Phila., VIII, p. 286; Jl. Acad. N. Sci. Phila., VI, 1868, p. 254, pl. XXX, fig. 68; * Obs., XII, 1869, p. 14, pl. XXX, fig. 63.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 61.—* PÆTEL, Conch. Sam., III, 1890, p. 151.

* *Margaron (Unio) emesaensis* LEA, Syn., 1870, p. 57.

†* *Unio simonis* TRISTRAM, Pr. Zool. Soc. Lond., 1865, Pt. 2, p. 544.[2]—* LOCARD, Arch. Mus. Lyon, III, 1883, p. 239, pl. XX, figs. 1–3.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 60.—* PÆTEL, Conch. Sam., III, 1890, p. 167.—* KOBELT, Icon., new ser., VI, 1893, p. 91, pl. CLXXVI, fig. 1121; first supp., 1895, p. 18, pl. III, figs. 1–3.

* *Unio luynesi* LOCARD, Arch. Mus. Lyon, III, 1883, p. 205.—* PÆTEL, Conch. Sam., III, 1890, p. 158.

* *Unio galilæi* LOCARD, Arch. Mus. Lyon, III, 1883, p. 206, pl. XX, figs. 10–12.[3]—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 60.—* KOBELT, Icon., 1st sup., 1895, p. 20, pl. VII, figs. 4, 5.

* *Unio timius* LOCARD, Arch. Mus. Lyon, III, 1883, p. 207, pl. XX, figs. 13, 14.—* PÆTEL, Conch. Sam., III, 1890, p. 169.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 61.

* *Unio rhomboidopsis* LOCARD, Arch. Mus. Lyon, III, 1883, p. 239, pl. XX, figs. 7–9.—* PÆTEL, Conch. Sam., III, 1890, p. 165.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 61.

* *Unio rollei* KOBELT, Icon., 1st supp., 1895, p. 20, pl. IV, figs. 1, 2.

* *Unio trachæ* KOBELT, Icon., 1st supp., 1895, p. 21, pl. VII*a*, fig. 2.[4]

* *Unio wagneri* KOBELT, Icon., 1st supp., 1895, p. 22, pl. VII, figs. 1, 2.

Asia Minor.

†UNIO HOMSENSIS Lea.

* *Unio homsensis* LEA, Proc. Acad. Nat. Sci. Phila., VIII, 1864, p. 285; Jl. Acad. Nat. Sci. Phila., VI, 1868, p. 249, pl. XXIX, figs. 63; * Obs., XII, 1869, p. 9, pl. XXIX, fig. 63.—* LOCARD, Arch. Mus. Lyon., III, 1883, p. 275.—* PÆTEL, Conch. Sam., III, 1890, p. 155.—* WESTERLUND, Faun. Pal. II, Pt. 7, 1890, p. 62.

* *Margaron (Unio) homsensis* LEA, Syn. 1870, p. 31.

Syria.

[1] Lea and Ferussac both referred this to *littoralis* after examining Lamarck's shells. I have seen specimens in the collection of the former from the Jardin des Plantes, Paris, which are, no doubt, authentic, and which, I think, perhaps, are specifically different from *littoralis*, being much shorter and more rounded.

[2] A specimen of this in the U. S. National Museum collection, from Tristram, labeled as above, is the same as Lea's examples of *semirugatus*.

[3] Published as *Unio maris-galilæi* in list in Comptes Rendus, XCI, p. 502; but not described.

[4] Some of these approach very close to specimens of *U. littoralis*, especially to the form called *U. rothi* Bourguignat, which I have placed in that species, and I should not be surprised if there was an absolute connection between the short, rounded forms of *U. semirugatus* and the longer rhomboid *U. littoralis*.

UNIO PSEUDONYMUS Simpson.[1]

* *Unio hueti* KOBELT, Icon., new ser., II, 1886, p. 22, pl. XLI, fig. 225.

Euphrates and Tigris rivers.

† UNIO FERUSSACIANUS Lea.

* *Unio ferussacianus* LEA, Jl. Acad. Nat. Sci. Phila., VI, 1868, p. 255. Footnote to description of *U. emesaensis*.—* LEA, Obs., XII, 1869, p. 15. Footnote.

* *Margaron* (*Unio*) *ferussacianus* LEA, Syn., 1870, p. 46.

Bagdad.

UNIO EPISCOPALIS Tristram.

* *Unio episcopalis* TRISTRAM,[2] Pr. Zool. Soc. Lond., 1865, p. 544.—VON MARTENS Vorderas. Conch., 1874, p. 68.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 62.—* PÆTEL. Conch. Sam., III, 1890, p. 151.—* KOBETT, Icon., VI, new ser., 1893, p. 89, pl. CLXXV, fig. 1119.

Orontes River, Syria.

† UNIO DURIEUI Deshayes.

* *Unio durieui* DESHAYES, Hist. Nat. Moll. Alg. Atlas, 1847, pl. CIX, figs. 5–8.[3]—BOURGUIGNAT, Mol. Alg., II, 1864, p. 288, pl. XIX, figs. 4–8.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 142.—* PÆTEL, Conch. Sam., III, 1890, p. 151.

* *Margaron* (*Unio*) *durieui* LEA, Syn., 1852, p. 39; 1870, p. 48.

* *Unio sitifensis* MORELET, Jl. de Conch., II, 1851, p. 360.

Unio orientalis BOURGUIGNAT, Test. Noviss., 1852, p. 29.

* *Unio bruguierianus* BOURGUIGNAT, Cat. Rais., 1853, p. 78, pl. II, figs. 54–58.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 172.—* PÆTEL, C. Sam., III, 1890, p. 146.

* *Margaron* (*Unio*) *bruguierianus* LEA, Syn., 1870, p. 44.

* *Unio vescoi* BOURGUIGNAT, Rev. et. Mag., VIII, 1856, p. 74, pl. II, figs. 4–8.[4]—* KOBELT, Icon., IV, 1876, p. 66, pl. CXIX, fig. 1154.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 152.—* PÆTEL, Conch. Sam., III, 1890, p. 171.

* *Margaron* (*Unio*) *vescoi* LEA, Syn., 1870, p. 46.

* *Unio schwerzenbachi* BOURGUIGNAT, Rev. et Mag., VIII., 1856, p. 75, pl. VIII, figs. 1–5.—* KUSTER, Conch. Cab. Unio, 1862, p. 266, pl. XC, fig. 2.—* SOWERBY, Conch. Icon., XVI, 1868, pl. XLIV, fig. 241.—* KOBELT, Icon., VII, 1880, p. 81, pl. CCVI, fig. 2099.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 95.

* *Unio prusii* BOURGUIGNAT, Rev. et Mag., VIII, 1856, p. 76, pl. III, figs. 1–4.

* *Unio damascensis* LEA,[5] Proc. Acad. Nat. Sci. Phila., VII, 1863, p. 190; Jl. Acad.

[1] Kobelt supposed this to be the *U. hueti* of Bourguignat, and figured and described it for that species. It is, however, very distinct, and I therefore am compelled to give it a new name.

[2] Tristram only describes this in Latin, and does not figure it; and as I have never seen an authentic specimen I am obliged to depend on Kobelt's figure, which agrees well with Tristram's diagnosis. These make it a large, somewhat sulcate form, shaped like *batarus*, but more compressed and having a beautiful purple nacre.

[3] There does not seem to be any essential difference between the Algerian and the Syrian shells, which I have referred to this species.

[4] Bourguignat says he has received numerous specimens of this from Drouet, labeled *U. turcicus* Parreyss, but Parreyss's names were only in manuscript, and were never published, and have therefore no scientific standing.

[5] Only the type is in the Lea collection, and it appears to be a delicate specimen of *duricui*.

Nat. Sci. Phila., VI, 1866, p. 55, pl. XVIII, p. 52; *Obs., XI, 1869, p. 59, pl. XVIII, fig. 52.—*PÆTEL, Conch. Sam., III, 1890, p. 150.—*WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 178.

*Margaron (*Unio*) *damascensis* LEA, Syn., 1870, p. 52.

Unio orontesensis LEA, Pr. Acad. Nat. Sci. Phila., VII, 1863, p. 190; Jl. Acad. Nat. Sci. Phila., VI, 1866, p. 53, pl. XVIII, fig. 50; *Obs., XI, p. 57, pl. XVIII, fig. 50.—*WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 178.—PÆTEL, Conch. Sam., III, 1890, p. 162.

*Margaron (*Unio*) *orontesensis* LEA, Syn., 1870, p. 52.

Unio orphaensis LEA, Pr. Acad. Nat. Sci. Phila., VIII, 1864, p. 285; Jl. Acad. Nat. Sci. Phila, VI, 1868, p. 250, pl. XXIX, fig. 64; *Obs., XII, 1869, p. 10, pl. XXIX, fig. 64.—*WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 179.—*PÆTEL, Conch. Sam., III, 1890, p. 162.

*Margaron (*Unio*) *orphaensis* LEA, Syn., 1870, p. 52.

Unio mardinensis LEA, Pr. Acad. Nat. Sci. Phila., VIII, 1864, p. 286; *Jl. Acad. Nat. Sci. Phila., VI, 1868, p. 252, pl. XXX, fig. 66; *Obs., XII, 1869, p. 12, pl. XXX, fig. 66.—*WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 179.

*Margaron (*Unio*) *mardinensis* LEA, Syn., 1870, p. 53.

†UNIO DURIEUI var. KULLETHENSIS Lea.

*Unio *kullethensis* LEA, Pr. Acad. Nat. Sci. Phila., VIII, 1864, p. 285; *Jl. Acad. Nat. Sci. Phila., VI, 1868, p. 251, pl. XXIX, fig. 67; *Obs., XII, 1869, p. 11, pl. XXIX, fig. 65.—*WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 178.

*Margaron (*Unio*) *kullethensis* LEA, Syn., 1870, p. 53.

*Unio *kallethensis* and *kullinthensis* PÆTEL, Conch. Sam., III, 1890, p. 156.

Algiers; Tunis; Asia Minor, Assyria; Southeastern Europe.

†UNIO SYRIACUS Lea.[1]

*Unio *syriacus* LEA, Pr. Acad. Nat. Sci. Phila., VII, 1863, p. 189; *Jl. Acad. Nat. Sci. Phila., VI, 1866, p. 56, pl. XIX, fig. 53; *Obs., XI, 1867, p. 60, pl. XIX, fig. 53.—*WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 178.—*PÆTEL, Conch. Sam., III, 1890, p. 169.

*Margaron (*Unio*) *syriacus* LEA, Syn., 1870, p. 35.

Orontes River, Syria.

UNIO BYTHINICUS Kobelt.

*Unio *bythinicus* KOBELT, Icon. new ser., VI, 1893, p. 96, pl. CLXXIX, fig. 1128.

Asia Minor.

UNIO MICELII Kobelt.

*Unio *micelii* KOBELT, Nach. Mal. Ges., XVI, 1884, p. 182; Icon., new ser., II, 1886, p. 24, pl. XLIII, figs. 260, 261.

Tunis.

†UNIO EMARGINATUS Lea.[2]

*Unio *emarginatus* LEA, Tr. Am. Phil. Soc., V, 1834, p. 62, pl. IX, fig. 22; *Obs., I, 1834, p. 174, pl. IX, fig. 22.

[1] I have only seen a single, badly eroded specimen, the type, but it seems to differ from anything I know. It probably belongs to this group.

[2] Lea's only shell, the type, consists of two opposite, odd valves. One of these may possibly be an elongated *batavus*, the other appears distinct.

* *Margarita* (*Unio*) *emarginatus* LEA, Syn., 1838, p. 26.
* *Margaron* (*Unio*) *emarginatus* LEA, Syn., 1852, p. 39; 1870, p. 62.

Locality unknown. I have no doubt that it belongs somewhere in the circummediterranean region.

† UNIO CARNEUS Kuster.

* *Unio carneus* KUSTER, Conch. Cab. Unio, 1854, p. 103, pl. XXVIII, figs. 1, 2.—* DROUET, Mem. Acad. Dijon, VII, 1882, p. 23, reprint.—* PETEL, Conch. Sam., III, 1890, p. 147.
* *Unio gontierii* BOURGUIGNAT, Rev. et Mag., IX, 1857, p. 16, pl. IV, figs. 1–4.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 67.
* *Margaron* (*Unio*) *gontieri* LEA, Syn. 1870, p. 44.
* *Unio penchinatianus* BOURGUIGNAT, Moll. Peu. Con., 1863, p. 44, pl. XXV; * Rev. et Mag., XVII, 1865, p. 342, pl. XXI.—* KOBELT, Icon., IV, 1876, p. 66, pl. CXIX, fig. 1155.

Southern Europe.

† UNIO BATAVUS Maton and Rackett.

* ? *Mya pictorum* GMELIN, Syst. Nat., 13th ed., 1788, p. 3218[1].—* DONOVAN, Brit. Shells, V, 1803, pl. CLXXIV.—* ? CHENU, Bib. Conch., 1st ser., I, 1845, p. 114, pl. XLVII, figs. 8, 9.
* *Unio pictorum* DRAPARNAUD, part, Hist. Moll. Fr., 1806, p. 131, pl. XI, figs. 1–4.[2]
* *Mya batava* MATON and RACKETT,[3] Tr. Linn. Soc. Lond., VIII, 1807, p. 37.—* WOOD, Gen. Conch., I, 1815, p. 303, pl. XIX, figs. 1, 2.—* DILLWYN, Cat., I, 1817, p. 49.—* TURTON, Conch. Dict., 1819, p. 105.—* WOOD, Ind. Test., 1825, p. 12, pl. II, fig. 25*b*; rev. ed., 1856, p. 15, pl. II, fig. 25.
* *Unio batava* LAMARCK, An. sans Vert., VI, 1819, p. 78.[4]—C. PFEIFFER, Nat. L. and Suss. Moll., Pt. 1, 1821, p. 119, pl. V, fig. 14.—* DESHAYES, Enc. Méth., II, 1827, p. 151, pl. CCXLVIII, fig. 3; II, 1830, p. 584, pl. CCXLVIII, fig. 3.—* WAARDENBERG, Com. Hist. Nat. An., 1827, p. 36.—* KLEEBERG, Moll. Bor., 1828, p. 38.—* FLEMING, Hist. Brit. Moll., 1828, p. 416.—* STARK, Nat. Hist., II, 1828, p. 90.—* MICHAUD, Comp. Hist. Moll. Fr., 1831, p. 109.—* GOUPIL, Hist. Moll. Sarthe, 1835, p. 83.—* FOURNEL, Faun. Moselle, I, 1836, p. 487.—* GRAS, Moll. Isere., 1840, p. 21.—* CATLOW and REEVE, Conch. Nom., 1845, p. 56.—* PUTON, Moll. Vosges, 1847, p. 75.
* *Mysca batava* TURTON, Conch. Ins. Brit., 1822, p. 244.—* TURTON, Man. L. and F. W. Shells, Brit. Is., 1831, pl. XX. fig. 10.
* *Unio batavus* NILSSON, Hist. Moll. Svec., 1822, p. 112.—* ROSSMASSLER, Icon., II, 1835, p. 20, pl. VIII, figs. 128, 128*a*, 128*b*; III, 1836, pp. 28, 32, pl. XIV, fig. 205; XV, fig. 214; V and VI, 1837, p. 56, pl. XXIX, fig. 414; XI, 1842, p. 14, pl. LV, fig. 745.—* BROWN, L. and F. W. Conch., 1836, p. 111, pl. XVIII, figs. 6–8; XXI, figs. 10, 11.—* ? ANTON, Verz. der Conch., 1839, p. 15.—* HANLEY, Test. Moll., 1842,

[1] Gmelin refers to the figure by Chemnitz in Conchylien Cabinet, VI. This figure is probably a light-colored *batavus*.
[2] Fig. 3 is certainly *batavus*, and figs. 1 and 2 may be.
[3] Maton and Rackett do not figure their species, but refer to several figures. The first is in Ginanni, Opere Postume, 1755, pl. IV, fig. 17. This work I have not seen. The figures referred to in Schröter's Flussconchylien, in Chemnitz, and the Encyclopédie Methodique (pl. 248, fig. 3) are what we understand as *U. batavus*, the latter being the one cited by Lamarck.
[4] Lamarck does not figure his species, but refers to plate CCXLVIII, fig. 3, in the Encyclopédie Méthodique, which is the species commonly known as *Unio batavus*.

p. 195; *Biv. Shells, 1843, p. 195.—*Scholz, Schleis. L. and W. Moll., 1843, p. 133.—*Brown, Ill. Recent Conch., 1844, p. 82, pl. xxxi, figs. 3, 3*a*, 4–6.—*Dupuy, Hist. Moll. Fr., 1852, p. 638, pl. xxv, figs. 14, 15.—*Kuster, Conch. Cab. Unio, 1854, p. 121, pl. xxxiii, figs. 4–7; xxxiv, figs. 1, 2.—*von Wahl, Suss. Biv. Liv., 1855, p. 96.—*Moquin-Tandon, Moll. Terr. et Fluv. Fr., II, 1855, p. 571, pl. xlix, figs. 7, 8.—*Drouet, Nay. Fr., II, 1857, p. 79, pl. vi, fig. 1.—*H. and A. Adams, Gen. Rec. Moll., II, 1857, p. 493.—*Bielz, Faun. Sieben, 1863, p. 193.—*Bourguignat, Mal. Alg., 1864, p. 286, pl. xix, fig. 9; xx, figs. 1–4.—*Sowerby, Conch. Icon., XVI, 1866, pl. xlii, fig. 234.—*Brot, Coq. Fam. Nay. Leman, 1867, p. 49, pl. ix, figs. 1–5.—*Kobelt, Faun. Nass. Moll., 1871, p. 242.—*Lehman, Die Schnecken, 1873, p. 295.—*Clessin, Deutsche Ex. Moll., 1876, p. 463, fig. 302.—*Drouet, Mem. Acad. Dijon, VII, 1882, p. 18 (reprint).—*Clessin, Moll. Oest., 1887, p. 741.—*Westerlund, Faun. Pal., II, Pt. 7, 1890, p. 74.—*Pætel, Conch. Sam., III, 1890, p. 145.—*Locard, Coq. de Fr., 1893, p. 167.—*Westerlund, Act. Soc. F. and F. F., XIII, No. 7, 1897, p. 162.

**Margarita* (*Unio*) *batavus* Lea, Syn., 1836, p. 26; 1838, p. 20.

**Margaron* (*Unio*) *batavus* Lea, Syn., 1852, p. 30; 1870, p. 47.

**Unio batavi* var.? Rossmassler, Icon., V and VI, 1837, p. 55, pl. xxix, fig. 410.

**Unio nanus* Dupuy, Hist. Moll. Fr., 1852, p. 640, pl. xxv, fig. 16.—*Kobelt, Icon., VI, 1879, p. 42, pl. clxii, figs. 1642, 1643.—*Locard, Coq. de Fr., 1893, p. 154, fig. 168.

**Unio riparia* C. Pfeiffer, Nat. L. and S. Moll., 1821, Pt. 1, p. 118, pl. v, fig. 13.—*Kleeberg, Moll. Bor., 1828, p. 39.

**Unio riparius* Scholz, Schleis L. and W. Moll., 1843, p. 129.—*Westerlund, Faun. Pal., II, Pt. 7, 1890, p. 90.—*Locard, Coq. de Fr., 1893, p. 164.

**?Unio crassus* Nilsson,[1] Hist. Moll. Svec., 1822, p. 108.—*Rossmassler, Icon., II, 1835, p. 19, pl. viii, figs. 126, 127[2]; V and VI, 1837, p. 55, pl. xxxix, fig. 411.—Moquin-Tandon, Moll. Terr. and Fluv. Fr., II, 1855, p. 570; III, pl. xlix, figs. 3, 4.—*Nordenskiöld and Nylander, Fin. Moll., 1856, p. 84, pl. vi, fig. 72.—*Drouet, Nay. Fr., II, 1857, p. 76, pl. iv, fig. 2.—*Westerlund, Faun. Sw., N. and Den., 1873, p. 569.[3]—*Locard, Coq. de Fr., 1893, p. 162, fig. 176.—*Westerlund, Acta Soc. F. and F. F., XIII, No. 7, 1897, p. 159.

**Unio crassus* variety *batavus* Jordan, Jahrb. Deuts. Mal. Ges., VI, 1879, p. 307.

**Unio ater* Nilsson, Hist. Moll. Svec., 1822, p. 107.—*Rossmassler, Icon., II, 1835, p. 23, pl. ix, fig. 133; VII and VIII, 1838, p. 41, XL, fig. 543.—*Scholz, Schleis. L. and F. W. Moll., 1843, p. 131.—*Kuster, Conch. Cab. Unio, 1854, p. 114, pl. xxi, figs. 1, 2, 6; xxxii, figs. 1–4.—*Moquin-Tandon, Moll. Terr. et Fluv. Fr., II, 1855, p. 570, pl. xlix, figs. 5, 6.—*Drouet, Nay. Fr., II, 1857, p. 72, pl. iv, fig. 1; Mem. Acad. Dijon, VII, 1882, p. 14 (reprint).—*Westerlund, Faun. Pal., II, Pt. 7, 1890, p. 65.—*Pætel, Conch. Sam., III, 1890, p. 145.—*Locard, Coq. de Fr., 1893, p. 176.—*Westerlund, Act. Soc. F. and F. F., XIII, No. 7, 1897, p. 160.

**Unio atra* Deshayes, Encyc. Meth., II, 1830, p. 582.

Unio rugatus Menke, Syn. Moll., 1828, p. 90.—*Rossmassler, Icon., V and VI, 1837, p. 65, pl. xxix, fig. 415.

**Unio elongata* Michaud, Comp. Hist. Moll. Fr., 1831, p. 113, pl. xvi, fig. 29.

**Unio labacensis* Rossmassler, Icon., II, 1835, p. 21.

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[1] Nilsson claims that this is Retzius' species, and that it is found in the rivers of Sweden. His Latin description is so brief that nothing can be made out of it. I have no doubt that he had *Unio batavus* before him when he wrote it.

[2] I believe that this is a rather large *batavus* and the figures are almost exactly like those he gives of that species.

[3] Claimed to be *crassus* of Retzius, but he gives *U. ater* of Nilsson as one variety and *batavus* Lamarck as another.

* *Unio decurratus* ROSSMASSLER, Icon., II, 1835, p. 22, pl. IX, fig. 131; V and VI, 1837, p. 21, pl. XXIV, fig. 339.—† KUSTER, Conch. Cab. Unio, 1856, p. 108, pl. XXX, figs. 1, 2.—* MUSGRAVE, Phot. Conch., 1863, pl. II, fig. 4.—SOWERBY, Conch. Icon., XVI, 1867, pl. LVI, fig. 284.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 92.—P.ETEL, Conch. Sam., III, 1890, p. 150.

* *Unio reniformis* ROSSMASSLER, Icon., III, 1836, p. 31, pl. XV, fig. 213.—* SCHOLZ, Schleis, L. and W. Moll., 1843, p. 132.—* KUSTER, Conch. Cab. Unio, 1854, p. 110, pl. XXX, figs. 3, 4.—* BOURGUIGNAT, Rev. et Mag., 1865, pl. XXIII, figs. 4–6.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXII, fig. 371.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 80.—* LOCARD, Coq. de Fr., 1893, p. 161.

* *Unio carinthiacus* ROSSMASSLER, Icon., III, 1836, p. 30, pl. XV, fig. 209.[1]—* SOWERBY, Conch. Icon., XVI, 1856, pl. XXX, fig. 157; * P.ETEL, Conch. Sam., III, 1890, p. 147.—* LOCARD, Coq. de Fr., 1893, p. 167.

* *Unio amnicus* ROSSMASSLER, Icon., III, 1836, p. 31, pl. XV, fig. 212.—* KUSTER, Conch. Cab. Unio, 1856, p. 99, pl. XXVII, fig. 2.—* DROUET, Mem. Acad. Dijon, VIII, 1882, p. 22 (reprint).—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 89.—* LOCARD, Coq. de Fr., 1893, p. 163, fig. 177.

* *Unio piscinalis* ROSSMASSLER, Icon., III, 1836, p. 30, pl. XV, fig. 210.—* LOCARD, Coq. de Fr., 1893, p. 160.

* *Unio atrovirens* ROSSMASSLER, Icon., III, 1836, p. 28, pl. XV, figs. 206, 207.—SCHMIDT, Bull. Imp. Soc. N. H. Moscow, 1840, p.

* *Unio consentaneus* ROSSMASSLER, Icon., III, 1836, p. 29, pl. XV, fig. 208; VII, 1838, p. 25, pl. XXXV, fig. 491; p. 42, XL, fig. 544; XI, 1842, p. 14, pl. LV., fig. 742.

* *Unio fusculus* ROSSMASSLER, Icon., III, 1836, p. 30, pl. XV, fig. 211.—* P.ETEL, Conch. Sam., III, 1890, p. 153.—* LOCARD, Coq. de Fr., 1893, p. 159, fig. 173.

* *Unio?* ROSSMASSLER, Icon., III, 1836, p. 27, pl. XIV, fig. 201.

* *Unio stevenianus* DROUET, Unionidæ Russ., 1881, p. 14;[2] Jl. de Conch., XXIX, 1881, p. 24; Supp. Un. Serbie, 1884, pls. I, II.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 66.—* KOBELT (part), Icon., new ser., II, 1886, p. 38, pl. LII, fig. 281.[3]

† *Unio bandini* KUSTER, Icon., V and VI, 1837, p. 22, pl. XXIV, fig. 341.

* *Unio glaucinus* PORRO, Mal. Como., 1838, p. 115.—† CATLOW and REEVE, Conch. Nom., 1845, p. 59.—* STABILE, Faun. Lug., 1845, p. 61, pl. III, fig. 75.—* KOBELT, Icon., new ser., II, 1886, p. 19, pl. XL, fig. 251.—* P.ETEL, Conch. Sam., III, 1890, p. 154.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 90.

* *Unio gargottæ* ROSSMASSLER, Icon., VII, 1838, p. 26, pl. XXXV, fig. 493.—* MONTEROSATO, Nat. Sic., new ser., 1896, p. 6, fig. 1.

? Unio corrugata MANDUYT, Moll., Vienna, 1839, p. 8.

? Unio rotundata MANDUYT, Moll., Vienna, 1839, p. 9.[4]

? Unio gangrenosus SCHMIDT, Bull. Imp. N. H. Moscow, 1840, p. .—* KUSTER, Conch. Cab. Unio., 1854, p. 124, pl. XXXIV, figs. 3, 4.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 81.—* P.ETEL, Conch. Sam., III, 1890, p. 153.

Unio pruinosus SCHMIDT, Bull Soc. Nat. Mosc., 1840, p. 445.—* DROUET, Jl. de Conch., XXIX, 1881, p. 248; * Mem. Acad. Dijon, VII, 1882, p. 21 (reprint).—* P.ETEL, Conch. Sam., III, 1890, p. 164.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 82.—* LOCARD, Coq. de Fr., 1893, p. 160.

* *Unio littoralis* var. *minor* ROSSMASSLER (part), Icon., XI, 1842, p. 14, pl. LV, fig. 744.

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[1] Rossmassler credits this and several other species to Zeigler. So far as I am able to learn these are mere manuscript names. Neither Moquin Tandon or Locard give Zeigler as an author in their bibliographies of writers on French mollusks, and Lea refers only to his manuscript. I have not seen his Systematisches Verzeichniss.

[2] Generally credited to Krinické, who published the naked name in Bull. Nat. Mosc., 1837.

[3] Fig. 280, said to be this, is probably *U. tumidus*.

[4] Both these species of Manduyt are *batarus?* according to Moquin Tandon.

* *Unio manca* MILLET, Guer. Mag., 1843, p. 4, pl. LXIV, fig. 2.

* *Unio mancus* DUPUY, Hist. M. Fr., 1852, p. 642, pl. XXVI, fig. 17.—*LOCARD, Coq. Fr., 1893, p. 156, fig. 170.

* *Unio moquinianus* DUPUY, Moll. Gers., 1843, p. 80, pl.—* ROSSMASSLER, Icon., XII, 1844, p. 31, pl. LIX, fig. 769.—*KUSTER, Conch. Cab. Unio, 1854, p. 100, pl. XXVII, figs. 3, 4, 5.—* DUPUY, Hist. Moll. Fr., 1852, p. 644, pl. XXVI, fig. 18.—* MOQUIN-TANDON, Moll. Terr. and Fluv. Fr., 1855, p. 573, pl. L, figs. 1, 2.—* DUPUY, Rev. et Mag., VIII, 1856, p. 75.—* DROUET, Nay. Fr., II, 1857, p. 88, pl. VI, fig. 3.—* P.ETEL, Conch. Sam., III, 1890, p. 159.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 146.—* LOCARD, Coq. de Fr., 1893, p. 179.

* *Unio requieni* ROSSMASSLER, Icon., XII, 1844, p. 29, pl. LVII, figs. 757–761.—* KUSTER (part), Conch. Cab. Unio, 1856, p. 126, pl. XXXVI, fig. 2.[1] —* MOQUIN-TANDON, Moll. Terr. et Fluv. Fr., II, 1855, p. 574, pl. L, figs. 5–7.—* KOBELT, Icon., VI, 1879, p. 43, pl. CLXIII, fig. 1647.—* LOCARD, Coq. de Fr., 1893, p. 190.

* *Unio sandri* RASSMASSLER, Icon., XII, 1844, p. 26, pl. LVI, figs. 748–750.—* KUSTER, Conch. Cab. Unio, 1856, p. 101, pl. XXVII, figs. 6, 7.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXIX, fig. 413.—* P.ETEL, Conch. Sam., III, 1890, p. 166.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 93.

? *Unio aleroni* COMPANYO and MASSOT, Bull. Soc. Agr. Sc. Pyr. d'Or, VI, Pt. 2, 1845, p. 234, fig. 2.—* KOBELT, Icon., IV, 1876, p. 64, pl. CXVIII, fig. 1150.[2]

Unio badius KOKEIL, Mich. Comp., 1831, pl. XVI, fig. 36.—*CATLOW and REEVE, Conch. Nom., 1845, p. 56.—KOKEIL, Gallenst. Kärnt. Conch., 1852, p. ?.[3]

*? *Unio wolwichii* MORELET, Moll. Port., 1845, p. 105, pl. XIII, fig. 1.

Unio jacquemini DUPUY, Cat. Ext. Gall. Test., 1849, No. 328.—*DUPUY, Hist. M. Fr., 1852, p. 643, pl. XXV, fig. 17.—*KOBELT, Icon., VI, 1879, p. 42, pl. CLXII, fig. 1641.—*WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 128.—*LOCARD, Coq. Fr., 1893, p. 188.

Unio drouetı DUPUY, Cat. Ext. Gal. Test., 1849, No. 327; Hist. Moll. Fr., 1852, p. 639, pl. XXV, fig. 14.

Unio philippi DUPUY, Cat. Ext. Gal. Test., 1849, No. 335; Hist. Moll. Fr., 1852, p. 654, pl. XXVIII, fig. 19.

* *Unio ovalis* DUPUY, Hist Moll. Fr., 1852, p. 637, pl. XXV. fig. 13.

* *Unio spinellii* VILLA, in Moll. Bres., 1852, p. 50, fig. D.

* *Unio moulinsiana* DUPUY, Hist. Moll. Fr., VI, 1852, p. 640, pl. XXIV, fig. 10.—*MOQUIN-TANDON, Hist. Moll. Fr., II, 1855, p. 572.—*LOCARD, Coq. de Fr., 1893, p. 152.

*? *Unio petterianus* KUSTER, Conch. Cab., 1854, p. 97, pl. XXVII, fig. 4.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—*P.ETEL, C. Sam., III, 1890, p. 163.—*WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 115.

* *Margaron* (*Unio*) *petterianus* LEA, Syn., 1852, p. 31, 1870, p. 49.

* *Unio capigliolo* KUSTER (part), Conch. Cab. Unio, 1854, p. 125, pl. XXXIV, figs. 5, 6.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXXV, fig. 392.—*DUPUY, Hist. Moll. Fr., 1852, p. 645, pl. XXVI, fig. 19.

* *Unio heldi* KUSTER, Conch. Cab. Unio, 1854, p. 111, pl. XXX, figs. 5–7.—*DROUET, Jl. de Conch., XXIX, 1881, p. 26.—*WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 80.

* *Unio luxurians* KUSTER, Conch. Cab. Unio, 1854, p. 119, pl. XXXII, fig. 5.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 94.—* P.ETEL, C. Sam., III, 1890, p. 158.

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[1] Kuster gives several figures of what he supposes are *requieni*. Part of them are *turtoni*, and one is possibly *elongatulus* Pfeiffer.

[2] It is hard to tell just what this is. It is probably a delicate, rather compressed *batavus*.

[3] According to Lea and Westerlund this = *batavus*.

[5] *Unio brevirostris* KUSTER, Conch. Cab. Unio, 1854, p. 120, pl. XXXIII, figs. 1–3.—[6] WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 96.

[7] *Unio natolicus* KUSTER, Conch. Cab. Unio, 1856, p. 144, pl. XLII, fig. 4.

[8] *Unio turcicus* KUSTER, Conch. Cab. Unio, 1862, p. 267, pl. XC, figs. 3, 4.

[9] *Unio merdiger* REEVE, Conch. Icon., XVI, 1865, pl. XXVIII, fig. 145.[1]

Europe; Asia Minor; Northwest Africa.

Section LAPIDOSUS Simpson, 1900.

(Type, *Unio lapidosus* Kobelt.[2])

Shell inequilateral, subtriangular ovate, large, solid, slightly inflated, with a double posterior ridge, biangulate behind; beaks high, sculpture not seen; disks strongly, irregularly sulcate; epidermis olive; three thick pseudocardinals in the right valve and two in the left; laterals strong; anterior muscle scars deep, tripartite; posterior scars deep, distinct; nacre rosy white, irridescent behind. Animal unknown.

UNIO LAPIDOSUS Kobelt.

[10] *Unio lapidosus* KOBELT, Nach Deuts. Mal. Ges., 1893, p. 151; [11] Icon., new ed., VI, 1893, p. 90, pl. CLXXVI, fig. 1120.—[12] DROUET, Jl. de Conch., XLIII, 1895, p. 32.

Euphrates River.

Section ELLIPTIO Rafinesque, 1819.

(Type, *Unio crassidens* Lamarck.)

Shell elongated, rhomboid or oval, usually more or less biangulate behind; beak sculpture consisting of a few rather strong ridges, which are nearly parallel to the growth lines or slightly doubly looped; the surface smooth or feebly corrugated.

(Group of *Unio coloratus*.)

Shell somewhat rhomboid, solid, slightly biangulate behind, rather compressed, more or less sculptured with concentric sulcations; beaks moderately prominent, their sculpture unknown; epidermis brownish; teeth strong; laterals rather club-shaped; nacre white or purple. Animal unknown.

?† UNIO COLORATUS Charpentier.

[13] *Unio coloratus* CHARPENTIER, in Kuster, Conch. Cab. Unio, 1856, p. 155, pl. XLIV, fig. 6.—[14] PÆTEL, Conch. Sam., III, 1890, p. 148.—[15] FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 599.

Médellin River, Vera Cruz, Mexico.

[1] Credited to Jay's Catalogue, in which it is not described, but is credited to Waltz.

[2] This striking shell differs very much from any of the circummediterranean forms and may be entitled to subgeneric rank.

UNIO CALLOSUS Lea.

* *Unio callosus* LEA, Pr. Am. Phil. Soc. II, 1841, p. 31; *Tr. Am. Phil. Soc., VIII, 1842, p. 239, pl. XXIII, fig. 54; * Obs., III, 1842, p. 77, pl. XXIII, fig. 54.—* CONRAD, Pr, Acad. Nat. Sci. Phila., VI, 1853, p. 246.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—* CHENU, Ill. Conch., 1858, pl. XXVI, figs. 4, 4*a*, 4*b*.—* B. H. WRIGHT, Check List, 1888.—*P.ETEL, Conch. Sam., III, 1890, p. 147.

* *Margaron* (*Unio*) *callosus* LEA, Syn., 1852, p. 33; 1870, p. 33.

Said to come from the Ohio Canal below Columbus. I am sure that the locality is wrong, and it appears to be a Mexican form. The type is not in the Lea collection.

UNIO MEXICANUS Philippi.

* *Unio mexicanus* PHILIPPI, Zeits. für Mal., IV, 1847, p. 95.—* PHILIPPI, Abbild. und Beschr., III, 1849, p. 110, pl. VI, fig. 3.[1]—* KUSTER, Conch. Cab. Unio, 1862, p. 285, pl. XCV, fig. 7.—*B. H. WRIGHT, Check List, 1888.—*P.ETEL, Conch. Sam., III, 1890, p. 159.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 593.

* *Margaron* (*Unio*) *mexicanus* LEA, Syn., 1870, p. 53.

Mexico.

(Group of *Unio semigranosus*.)

Shell triangular rhomboid, solid, inflated, with a distinct posterior ridge; beaks rather full, their sculpture consisting of numerous somewhat irregular corrugations which pass into the pustulous sculpture of the shell; surface of the valves generally more or less sculptured with chevron-shaped or zigzag ridges or corrugations, which often break into pustules, the posterior slope bearing curved, radiating plications which are likewise sometimes nodulous; epidermis dark, scarcely rayed; pseudocardinals strong, radial, ragged; laterals heavy, obliquely striated; beak cavities not deep, compressed; muscle scars well impressed; nacre purple, with bronzy or coppery shades.

Animal apparently not different from that of other related Unios. I have not seen any with the marsupium filled.

† UNIO PLEXUS Conrad.

* *Margarita* (*Unio*) *carbonarius* LEA, Syn., 1836, p. 192; 1838, p. 17.[2]

* *Unio carbonarius* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 37, pl. XL, fig. 32; * Obs., II, 1838, p. 37, pl. XI, fig. 32.—*TROSCHEL, Arch. für Naturg., V, 1839, Pt. 2, p. 236.—* HANLEY, Test. Moll., 1842, p. 184; * Biv. Shells, 1843, p. 184, pl. XXII, fig. 10.—* CATLOW and REEVE, Conch. Nom., 1845, p. 57.—* CHENU, Ill. Conch., 1858, pl. XXIII, figs. 1, 1*a*, 1*b*.—* P.ETEL, Conch. Sam., III, 1890, p. 147.

* *Margarita* (*Unio*) *pliciferus* LEA, Syn., 1836, p. 13; 1838, p. 14.

* *Unio pliciferus* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 61, pl. XVII, fig. 53; *Obs., II, 1838, p. 61, pl. XVII, fig. 53.—* TROSCHEL, Arch. für Naturg., V, 1839, Pt. 2, p.

[1] A miserable figure of some rhomboidal, rather compressed form, probably grouping with *callosus*.

[2] The names *carbonarius* and *pliciferus* were published two years before *Unio plexus*, but were not accompanied by a description. Part X of the Monography appeared in May, 1838, and the transactions containing Dr. Lea's description of *carbonarius* June 15, according to Scudder. Dr. Lea places his *carbonarius* in the synonymy of *pliciferus*, though the former comes first in his paper.

256.—* HANLEY, Test. Moll., 1842, p. 176; * Biv. Shells, 1843, p. 176, pl. XX, fig. 32.—* CATLOW and REEVE, Conch. Nom., 1845, p. 63.—* KUSTER, Conch. Cab., 1848, p. 142, pl. XLII, fig. 1.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* CHENU, Ill. Conch., 1858, pl. XXII, figs. 5, 5*a*, 5*b*; Manual, 1859, II, p. 142, fig. 702.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXV, fig. 387.—* B. H. WRIGHT, Check List, 1888.—* FISCHER and CROSSE, Miss. Sci., II, Pt. 7, 1894, p. 580, pl. LXV, fig. 2; LXX, figs. 2, 2*a*.

Margaron (*Unio*) *pliciferus* LEA, Syn., 1852, p. 20; 1870, p. 31.

* *Unio plexus* CONRAD, Monog., X, 1838, p. 89, pl. XLIX, figs. 1, 2; * Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 255.

Vera Cruz, Mexico.

† UNIO CROCODILARUM Morelet.

* *Unio crocodilarum* MORELET, Test. Nov., I, 1849, p. 28.—* REEVE, Conch. Icon., XVI, 1864, pl. X, fig. 37.—* P.ETEL, Conch. Sam., III, 1890, p. 149.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 577, pl. LX, fig. 3; LXVII, fig. 3.

* ? *Unio rusticus* SOWERBY, Conch. Icon., XVI, 1868, pl. LXIV, fig. 321.

Rio Usumacinta, Guatemala.

UNIO MORINI Morelet.

* *Unio morini* MORELET, Test. Nov., II, 1851, p. 24.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 576, pl. LX, fig. 2; LXVII, fig. 4.

Rio Usumacinta, Guatemala.

UNIO SEMIGRANOSUS von dem Busch.

* *Unio semigranosus* VON DEM BUSCH (in Philippi), Abbild. und Besch., I, 1845, p. 19, pl. I, figs. 1-3.—* CATLOW and REEVE, Conch. Nom., 1845, p. 64.—* CONRAD, Pr. Acad. N. Sci. Phila., VI, 1853, p. 257.—* HANLEY, Biv. Shells, 1856, p. 381, pl. XX, fig. 33.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* KUSTER, Conch. Cab. Unio, 1861, p. 252, pl. LXXXV, fig. 1.—* B. H. WRIGHT, Check List, 1888.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 569.

* *Margaron* (*Unio*) *semigranosus* LEA, Syn., 1852, p. 20; 1870, p. 34.

* *Unio carbonarius* var. *semigranosus* P.ETEL, Conch. Sam., III, 1890, p. 147.

Mexico, Vera Cruz to Tampico.

† UNIO CORIUM Reeve.[1]

* *Unio corium* REEVE, Conch. Icon., XVI, 1864, pl. X, fig. 39.—* P.ETEL, Conch. Sam., III, 1890, p. 149.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 570.

State of Chiapas, Mexico.

UNIO TESTUDINEUS Morelet.

* *Unio testudineus* MORELET, Test. Nov., I, 1849 p. 28.[2]—FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 571, pl. LXII, fig. 3; LXX, fig. 3.

* *Unio semigranosus* REEVE, Conch. Icon., XVI, 1864, pl. X, fig. 36.

Rio Usumacinta, Guatemala.

[1] Probably a mere variety of *semigranosus*. It is quite likely that when a sufficient amount of material is examined this and some other species of this group will have to be placed in the synonymy.

[2] Fischer and Crosse think that *testudineus* is perhaps only a local race of *semigranosus*. I think it is quite likely they are right.

†UNIO PSORICUS Morelet.

* *Unio psoricus* MORELET, Test. Nov., Pt. 2, 1851, p. 25.[1]—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 572, pl. LXI, fig. 2.

Rio Usumacinta, Guatemala.

(Group of *Unio gibbosus*.)

Shell solid, compressed or inflated, triangular ovate to elongate ovate, arcuate when old, gibbous above, pointed or slightly biangulate behind, with a moderate posterior ridge; beaks low, the sculpture consisting of a few very strong ridges which run parallel with the growth lines; epidermis dull and clothlike; pseudocardinals strong, rough; laterals granular or vertically striated, club-shaped; beak cavities very shallow; one or more slight furrows or ridges occur in the cavity of the shell which run nearly parallel with the laterals; muscle scars very deep and distinct.

Marsupium occupying the entire outer gills; branchiæ large, curved below, inner the wider except at the posterior end, free from the abdominal sac only part of their length; mantle very thin, with thickened edges; branchial opening generally large.

†UNIO GIBBOSUS Barnes.

* *Unio nasuta* LAMARCK,[2] An. sans Vert., VI, 1819, p. 75.—* DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 538; 3d ed., II, 1839, p. 669.

* *Unio nasutus* AGASSIZ, Arch. für Nat., I, 1852, p. 50.

* *Unio gibbosus* BARNES, Am. Jl. Sci., VI, 1823, p. 262, pl. XI, fig. 12.[3]—* HILDRETH, Am. Jl. Sci., XIV, 1828, p. 286.—SHORT and EATON, Transylvania Jl., 1831, p. 78.—* HANLEY, Test. Moll., 1842, p. 207; Biv. Shells, 1843, p. 207, pl. XX, fig. 51.—* CATLOW and REEVE, Conch. Nom., 1845, p. 59.—* KUSTER, Conch. Cab. Unio, 1852, p. 28, pl. IV, figs. 3, 4.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—* SOWERBY, Conch. Icon, XVI, 1868, pl. LXXIII, fig. 379.—* CALKINS, Pr. Ottawa Ac. Sci., 1874, p. 42.—* LATCHFORD, Tr. Ottawa F. N. Club, 1882, p. 50.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 153.—* BAKER, Moll. Chicago, 1898, p. 70, pl. XIV, figs. 3, 4; XV, figs. 1–4.

Margarita Unio gibbosus LEA, Syn., 1836, p. 38; 1838, p. 25.

* *Margaron* (*Unio*) *gibbosus* LEA, Syn. 1852, p. 38; 1870, p. 61.

* *Mya gibbosa* EATON, Zool. Text-Book, 1826, p. 220.

* *Unio mucronatus* BARNES, Am. Jl. Sci., VI, 1823, p. 266, pl. XIII, fig. 13 (outline).—* AGASSIZ, Arch. für Naturg., I, 1852, p. 50.

* *Mya mucronata* EATON, Zool. Text-Book, 1826, p. 221.

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[1] Probably another variety of *semigranosus*.

[2] This name was given by Lamarck to the species under consideration before that of Barnes, but Say had already used the name *nasutus* for a *Unio*, hence *gibbosus* must be used.

[3] In 1820 Rafinesque bestowed the name *Amblema gibbosa* on some unionoid mollusk which I can not determine. Since then Conrad in 1836, and others after him, have used the specific name as of Rafinesque and applied it to a *Unio*, which they have figured and described. Barnes applied the name in 1823, properly characterizing it, and it must stand, because at that time it had not been used in the genus *Unio*.

* *Unio dilatatus* SAY,[1] Am. Conch., VI, 1834.—* CONRAD, New F. W. Shells, 1834, p. 68.—* FERUSSAC, Guer. Mag., 1835, p. 27.—* CONRAD, Monog., V, 1836, p. 42, pl. XXI.—* KUSTER, Conch. Cab. Unio, 1852, p. 38, pl. VI, fig. 4.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 248.

* *Unio torulosus* FERUSSAC, Guer. Mag., 1835, p. 28.

* *Unio arctatus* FERUSSAC, Guer. Mag., 1835, p. 29.

*† *Unio arctior* LEA, Tr. Am. Phil. Soc , VI, 1838, p. 10, pl. IV, fig. 10;[2] Obs., II, 1838, p. 10, pl. IV, fig. 10.—* TROSCHEL, Arch. für Naturg., V, 1839, Pt. 2, p. 234.—* HANLEY, Test. Moll., 1842, p. 208; * Biv. Shells, 1843, p. 208, pl. XXII, fig. 46.—* CATLOW and REEVE, Conch. Nom., 1845, p. 56.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 245.—* KUSTER, Conch. Cab. Unio, 1861, p. 179, pl. LVI, fig. 6.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—* CHENU, Ill. Conch., 1858, pl. XXI, figs. 2, 2*a*, 2*b*.—*? SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXV, fig. 2.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 144.

* *Margarita* (*Unio*) *arctior* LEA Syn., 1836, p. 39; 1838, p. 25.

* *Margaron* (*Unio*) *arctior* LEA, Syn., 1852, p. 38; 1870, p. 71.

† UNIO GIBBOSUS var. ARCUS Conrad.

* *Unio arcus* CONRAD, Am. Jl. Sci., XXV, 1834, p. 340, pl. L, fig. 8; * New F. W. Shells, 1834, p. 67.—* FERUSSAC, Guer. Mag., 1835, p. 29.—* MÖLLER, Syn. Nov. Gen., 1836, p. 1898.—* HANLEY, Test. Moll., 1842, p. 207; * Biv. Shells, 1843, p. 207, pl. XXIII, fig. 46.—* CATLOW and REEVE, Conch. Nom., 1845, p. 56.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 245.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 144.

* *Margarita* (*Unio*) *arcus* LEA, Syn., 1836, p. 38; 1838, p. 25.

* *Margaron* (*Unio*) *arcus* LEA, Syn., 1852, p. 38; 1870, p. 61.

† UNIO GIBBOSUS var. SUBGIBBOSUS Lea.

* *Unio subgibbosus* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 169; Jl. Ac. N. Sci. Phila., IV, 1858, p. 53, pl. VI, fig. 36; Obs., VI, 1858, p. 53, pl. VI, fig. 36.—* B. H. WRIGHT, Check List, 1888.—* SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 432, pl. LXXVIII, fig. 5.

* *Margaron* (*Unio*) *subgibbosus* LEA, Syn., 1870, p. 61.

* *Unio lazarus* SOWERBY, Conch. Icon., XVI, 1868, pl. LXVIII, fig. 348.

* † *Unio rufus* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 171; Jl. Ac. N. Sci. Phila., IV, 1858, p. 85, pl. XVII, fig. 65; Obs., VI, 1858, p. 85, pl. XVII, fig. 65.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *rufus* LEA, Syn., 1870, p. 61.

† UNIO GIBBOSUS var. ARMATHWAITENSIS B. H. Wright.

* *Unio gibbosus* var. *armathwaitensis* B. H. WRIGHT, Naut., XI, 1898, p. 123.[3]

† UNIO GIBBOSUS var. DELICATUS Simpson.[4]

Entire Mississippi drainage; St. Lawrence and its tributaries; Alabama River system; southeast into Florida; southwest to the Guadalupe River, Texas.

[1] As of Rafinesque. I am unable to make out Rafinesque's species.

[2] Merely a form with white nacre.

[3] These three are dwarf varieties of *gibbosus*. All are often more or less humped, and there are many intermediate and connecting specimens.

[4] A greatly compressed, thin variety, with an evenly elliptical outline and very dark nacre may bear this name.

†UNIO STONENSIS Lea.

**Unio stonensis* LEA, Pr. Am. Phil. Soc., I, 1840, p. 286; * Tr. Am. Phil. Soc., VIII, 1841, p. 195, pl. VIII, fig. 5; Obs., III, 1842, p. 33, pl. VIII, fig. 5.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 258.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* CHENU, Ill. Conch., 1858, pl. XXIX, figs. 7, 7*a*, 7*b*.—* SOWERBY, Conch. Icon., XVII, 1868, pl. LXXXVI, fig. 462.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 168.

**Margaron* (*Unio*) *stonensis* LEA, Syn., 1852; 1870, p. 43.

Stone River, Tennessee.

†UNIO LURIDUS Lea.

**Unio luridus* LEA, Tr. Am. Phil. Soc., X, 1852, p. 273, pl. XX, fig. 29; Obs., V, 1852, p. 29, pl. XX, fig. 29.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 251; * H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 158.

**Margaron* (*Unio*) *luridus* LEA, Syn., 1852, p. 30; 1870, p. 48.

Yadkin River, North Carolina; Georgia; Florida.

(Group of *Unio discus.*)

Shell large, solid, compressed, subtriangular; biangulate behind; beak sculpture not seen; beaks high, but not swollen; epidermis dark, rough; teeth heavy; laterals remote, club-shaped; nacre white, yellow or purple.

Animal unknown.

†UNIO DISCUS Lea.

**Unio discus* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 74, pl. XVIII, fig. 57; * Obs., II, 1838, p. 74, pl. XVIII, fig. 51.—* TROSCHEL, Arch. für Naturg., V, 1839, Pt. 2, p. 237.—* HANLEY, Test. Moll., 1842, p. 197; * Biv. Shells, 1843, p. 197, pl. XXII, fig. 12.—* CATLOW and REEVE, Conch. Nom., 1845, p. 58.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 248.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* CHENU, Ill. Conch., 1858, pl. XIX, figs. 6, 6*a*, 6*b*.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXII, fig. 310.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 151.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 567.

**Margaron* (*Unio*) *discus* LEA, Syn., 1852, p. 31; 1870, p. 50.

* *Unio panacoensis*, VON DEM BUSCH in Philippi, Abbild. und Besch., I, 1843, p. 75, pl. II.—* KUSTER, Conch. Cab. Unio, 1861, pl. LXXXI, fig. 1.—* PÆTEL, Conch. Sam., III, 1890, p. 162.

**Unio mexicanus* SOWERBY, Conch. Icon., XVI, 1867, pl. LV, fig. 281.

Mexico; Central America.

(Group of *Unio sloatianus.*)

Shell rhomboid, solid, inflated, with a well-defined posterior ridge and a smaller, fainter one above, the posterior end being distinctly biangulate, nearly straight or slightly incurved on the base, rounded in front; beaks only slightly elevated; beak sculpture not observed; surface of the valves covered with somewhat radiately plicate, nodulous corrugations which become less pronounced in front; posterior

slope radially plicate; epidermis dark; pseudocardinals stumpy, radial, granularly striate; laterals double in the left valve, single in the right, with a faint, secondary ridge below; anterior muscle scars deep, nearly smooth; cavity of the beaks moderate, slightly compressed.

Animal unknown.

†UNIO SLOATIANUS Lea.

* *Unio sloatianus* LEA, Pr. Am. Phil. Soc., I, 1840, p. 287; Tr. Am. Phil. Soc., VIII, 1842, p. 217, pl. XVI, fig. 33; Obs., III, 1842, p. 55, pl. XVI, fig. 33.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* CHENU, Ill. Conch. 1858, pl. XXXII, figs. 7, 7*a*, 7*b*.—* KUSTER, Conch. Cab., 1862, p. 286, pl. XCVI, fig. 3.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 167.

* *Margaron* (*Unio*) *sloatianus* LEA, Syn., 1852, p. 21; 1870, p. 31.

* *Plectomerus sloatianus* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 261.

* *Unio atromarginatus* LEA,[1] Pr. Am. Phil. Soc., I, 1840, p. 288; Tr. Am. Phil. Soc., VIII, 1842, p. 207, pl. XIII, fig. 21; Obs., III, 1842, p. 45, pl. XIII, fig. 21.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 488.—* CHENU, Ill. Conch., 1858, pl. XXVIII, figs. 6, 6*a*, 6*b*.—* KUSTER, Conch. Cab. Unio, 1861, p. 250, pl. LXXXIV, fig. 2.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 145.

* *Margaron* (*Unio*) *atromarginatus* LEA, Syn., 1852, p. 19; 1870, p. 29.

* *Plectomerus atromarginatus* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 260.

* *Unio aratus* CONRAD, Ann. and Mag., IV, 1849, p. 302; * Pr. Ac. N. Sci. Phila. IV, 1849, p. 154.

* *Unio plectophorus* CONRAD, Jl. Ac. N. Sci. Phila., I, 1850, p. 277, pl. XXXVIII, fig. 7.

* *Plectomerus plectophorus* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 2.

Chattahoochee and Flint rivers, Georgia.

(Group of *Unio crassidens*.)

Shell generally solid, rather inflated, rhomboid oval, with a sharp, well-developed posterior ridge; beaks prominent, the sculpture consisting of a few coarse ridges running nearly parallel with the growth lines and swollen at the posterior ridge; surface of the valves nearly smooth or only marked by growth lines; posterior slope bearing wrinkled, corrugate, radiate ridges; epidermis often faintly rayed.

Animal having the branchiæ very large, rounded below, inner the larger, free nearly or quite their entire length from the abdominal sac; branchial and anal openings large, with many small papillæ; marsupium occupying the entire outer gills.

†UNIO CRASSIDENS Lamarck.

* *Unio crassidens* LAMARCK, An. sans Vert., VI, 1819, p. 71.—* LEA, Obs., I, 1834, p. 199.—* DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 532; 3d ed., II, 1839, p. 667.—* HANLEY, Test. Moll., 1842, p. 184; * Biv. Shells, 1843, p. 184, pl. XX, fig. 46.—* CATLOW and REEVE, Conch. Nom., 1845, p. 58.—* H. and A. ADAMS,

[1] Lea's type of *sloatianus* is an old, arcuate shell, while the type of *atromarginatus* is young and quite different looking. But the young plicate *atromarginatus* gradually changes into the smoother *sloatianus* as it grows older, and specimens of both show the dark bordered nacre, though it is more pronounced in the young shells.

Gen. Rec. Moll., II, 1857, p. 495.—* CALKINS, Pr. Ot. Ac. Sci., 1874, p. 42.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 149.—* CALL, Tr. Ac. Sci., St. Louis, VII, 1895, p. 12, pl. II.

* *Margarita* (*Unio*) *crassidens* LEA, Syn., 1836, p. 19; 1838, p. 17.

* *Margaron* (*Unio*) *crassidens* LEA, Syn., 1852, p. 24; 1870, p. 37.

*? *Unio nigra* RAFINESQUE, Ann. Gen. Sci. Brux., V, 1820, p. 291, pl. LXXX, figs. 1-4.

* *Unio niger* SAY, Am. Conch., VI, 1834.—* CONRAD, New F. W. Shells, 1834, p. 70.—* FERUSSAC, Guer. Mag., 1835, p. 27.—* CONRAD, Monog., VI, 1836, p. 49, pl. XXVI.—* KUSTER, Conch. Cab. Unio, 1852, p. 25, pl. IV, fig. 1.—* AGASSIZ, Arch. für Naturg., I, 1852, p. 50.—* CONRAD, Pr. Acad. N. Sci , Phila., VI, 1853, p. 253.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXVIII, fig. 408.

* ? *Unio cuneatus* BARNES, Am. Jl. Sci., VI, 1823, p. 263.—* HILDRETH, Am. Jl. Sci., XIV, 1828, p. 279, fig. 3.—* SHORT and EATON, Transylvania Jl., 1831, p. 78.

* *Mya cuneata* EATON, Zool. Text Book, 1826, p. 220.

*? *Unio discus* SOWERBY, Conch. Icon., XVI, 1868, pl. LXII, fig. 310.

* *Unio crassus* SOWERBY, Conch. Icon., XVI, 1868, pl. XCV, fig. 520.

Mississippi drainage generally; Alabama and Tombigbee rivers; southeast to the Chattahoochee River. In the southeastern part of its range this species seems to merge into *U. incrassatus*.

†UNIO INCRASSATUS Lea.[1]

* *Unio incrassatus* LEA, Pr. Am. Phil. Soc., I, 1840, p. 286; * Tr. Am. Phil. Soc., VIII, 1840, p. 217, pl. XVI, fig. 34; * Obs., III, 1842, p. 55, pl. XVI, fig. 34.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* CHENU, Ill. Conch., 1858, pl. XXX, figs. 5, 5*a*, 5*b*.—* KUSTER, Conch. Cab. Unio, 1861, p. 192, pl. LX, fig. 5.—* REEVE, Conch. Icon., XVI, 1865, pl. XXVI, fig. 127.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 155.

* *Margaron* (*Unio*) *incrassatus* LEA, Syn., 1852, p. 24; 1870, p. 37.

Coosa River system; Chattahoochee and rivers of north Florida; east to Savannah?.

†UNIO POLYMORPHUS B. H. Wright.

* *Unio polymorphus* B. H. WRIGHT, Naut., XIII, 1899, p. 42.

Spanish Creek, Charlton County, Georgia.

†UNIO FORBESIANUS Lea.

* *Unio forbesianus* LEA, Pr. Am. Phil. Soc., V, 1852, p. 251; * Tr. Am. Phil. Soc., X, 1852, p. 264, pl. XVI, fig. 17; * Obs., V, 1852, p. 20, pl. XVI, fig. 17.—* CONRAD, Pr. Acad. Nat. Sci. Phila., VI, 1853, p. 249.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* KUSTER, Conch. Cab. Unio, 1861, p. 310, pl. LXIX, fig. 6.—* MUSGRAVE, Phot. Conch., 1863, pl. II, fig. 2.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXI, fig. 361.—* B. H. WRIGHT, Check List, 1888.—* SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 410, pl. XLIX, fig. 3; L, figs. 2, 3.

* *Margaron* (*Unio*) *forbesianus* LEA, Syn., 1852, p. 24; 1870, p. 37.

*† *Unio moussonianus* LEA, Tr. Am. Phil. Soc., X, 1852, p. 268, pl. XVIII, fig. 22; * Obs., V, 1852, p. 24, pl. XVIII, fig. 22.—* CONRAD, Pr. Acad. N. Sci. Phila., VI, 1853, p. 252.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 160.

* *Margaron* (*Unio*) *moussonianus* LEA, Syn., 1852, p. 29; 1870, p. 46.

[1] I am doubtful whether this is more than a small, rhomboid, southeastern variety of *crassidens*, bearing the same relation to it that *U. subgibbosus* does to *U. gibbosus*.

*† *Unio corvus* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 112; *Jl. Acad. N. Sci., Phila., IV, 1859, p. 217, pl. XXVII, fig. 97; Obs., VII, 1859, p. 35, pl. XXVII, fig. 97.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXVIII, fig. 411.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 149.

* *Margaron (Unio) corvus* LEA, Syn., 1870, p. 37.

* *Unio vestitus* LEA, Pr. Ac. N. Sci., Phila., V, 1861, p. 393; * Jl. Ac. N. Sci., Phila., V, 1862, p. 189, pl. XXV, fig. 259; * Obs., IX, 1863, p. 11, pl. XXV, fig. 259.—* B. H. WRIGHT, Check List, 1888.

Margaron (Unio) vestitus LEA, Syn., 1870, p. 50.

Streams from the Congaree River, South Carolina, south to northern Florida.

†UNIO DANIELSII B. H. Wright.

* *Unio danielsii* B. H. WRIGHT, Naut., XIII, 1899, p. 31.

Spring Creek, Decatur County, Georgia.

†UNIO PUSILLUS Lea.[1]

* *Unio pusillus* LEA, Pr. Ac. N. Sci. Phila., I, 1840, p. 286; * Tr. Am. Phil. Soc., VIII, 1842, p. 220, pl. XVIII, fig. 36; * Obs., III, 1842, p. 58, pl. XVIII, fig. 36.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 256.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* CHENU, Ill. Conch., 1858, pl. XXXII, figs. 5, 5*a*, 5*b*.—* KUSTER, Conch. Cab., 1861, p. 197, pl. LXIII, figs. 3, 4.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 164.—* SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 411, pl. LI, figs. 2, 6.

* *Margaron (Unio) pusillus* LEA, Syn., 1852, p. 31; 1870, p. 48.

*† *Unio buxeus* LEA, Tr. Am. Phil. Soc., X, 1852, p. 261, pl. XV, fig. 13; * Obs., V, 1852, p. 17, pl. XV, fig. 13.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 245.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 147.

* *Margaron (Unio) buxeus* LEA, Syn., 1852, p. 29; 1870, p. 46.

*† *Unio anthonyi* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 41; *Jl. Ac. N. Sci. Phila., V, 1862, p. 197, pl. XXVII, fig. 266; * Obs., IX, 1863, p. 19, pl. XXVII, fig. 266.—* B. H. WRIGHT, Check List, 1888.

Margaron (Unio) anthonyi, LEA, Syn., 1870, p. 43.

Abbeville district, South Carolina; south to northern Florida.

†UNIO MERUS Lea.

* *Unio merus* LEA, Tr. Am. Phil. Soc., X, 1852, p. 260, pl. XV, fig. 10; * Obs., V, 1852, p. 16, pl. XV, fig. 10.—* CONRAD, Pr. Acad. N. Sci. Phila., VI, 1853, p. 252.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 159.

* *Margaron (Unio) merus* LEA, Syn., 1870, p. 54.

*† *Unio castus* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 306; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 349, pl. LVII, fig. 174; * Obs., VIII, 1860, p. 31, pl. LVII, fig. 174.—* B. H. WRIGHT, Check List, 1888.

* *Margaron (Unio) castus* LEA, Syn., 1870, p. 40.

South Carolina.

[1] The type is a young shell identical with one of Lea's *U. anthonyi*. The type of the latter is a little larger, lighter colored, and less rayed.

UNIO MASONI Conrad.[1]

* *Unio masoni* CONRAD, New F. W. Shells, 1834, p. 34, pl. v, fig. 2, p. 70.—* FERUSSAC, Guer. Mag., 1835, p. 29.—* CONRAD, Monog., III, 1836, p. 28, pl. XII, fig. 2.—* MÖLLER, Syn. Nov. Gen., 1836, p. 204.—* HANLEY, Test. Moll., 1842, p. 201; * Bi . Shells, 1843, p. 201, pl. XXIII, fig. 18.—* CATLOW and REEVE, Conch. Nom., 1845, p. 61.—* CHENU, Bib. Conch., 1st ser., III, 1845, p. 18, pl. II, fig. 1.—* KUSTER, Conch. Cab. Unio, 1852, p. 34, pl. v, fig. 6.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 252.—H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 158.

* *Margarita* (*Unio*) *masoni* LEA, Syn., 1836, p. 33; 1838, p. 23.

* *Margaron* (*Unio*) *masoni* LEA, Syn., 1852, p. 34; 1870, p. 55.

Savannah River, Georgia.

†UNIO FRATERNUS Lea.

* *Unio fraternus* LEA, Tr. Am. Phil. Soc., X, 1852, p. 263, pl. XVI, fig. 15; * Obs., V, 1852, p. 19, pl. XVI, fig. 15.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 249.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* KUSTER, Conch. Cab. Unio, 1861, p. 201, pl. LXVII, fig. 2.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 153.

* *Margaron* (*Unio*) *fraternus* LEA, Syn., 1852, p. 32; 1870, p. 51.

Abbeville district, South Carolina, to Columbus, Georgia.

†UNIO CONGARÆUS Lea.

* *Unio congaræus* LEA, Tr. Am. Phil. Soc., IV, 1831, p. 72, pl. VI, fig. 4; Obs., I, 1834, p. 82, pl. VI, fig. 4.—* CONRAD, New F. W. Shells, 1834, p. 68.—* FERUSSAC, Guer. Mag., 1835, p. 26.—* CONRAD, Monog., III, 1836, p. 27, pl. XII, fig. 1.—* HANLEY, Test. Moll., 1842, p. 200; * Biv. Shells, 1843, p. 200, pl. XXII, fig. 31.—* CATLOW and REEVE, Conch. Nom., 1845, p. 57.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 247.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* CHENU, Ill. Conch., 1858, pl. III, figs. 5, 5*a*, 5*b*.—* SOWERBY, Conch. Icon., XVI, 1867, pl. LIX, fig. 296.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 148.

* *Margarita* (*Unio*) *congaræus* LEA, Syn., 1836, p. 32; 1838, p. 22.

* *Margaron* (*Unio*) *congaræus* LEA, Syn., 1852, p. 33; 1870, p. 54.

*† *Unio fulvus* LEA,[2] Tr. Am. Phil. Soc., V, p. 96, pl. XIII, fig. 39; * Obs., I, 1834 p. 208, pl. XIII, fig. 39.—* FERUSSAC, Guer. Mag., 1835, p. 29.—* HANLEY, Test. Moll., 1842, p. 200; * Biv. Shells, 1843, p. 200, pl. XXIII, fig. 32.—* CATLOW and REEVE, Conch. Nom., 1845, p. 59.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* SOWERBY, Conch. Icon., XVI, 1858, pl. LXXXIX, fig. 483.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 153.

* *Margarita* (*Unio*) *fulvus* LEA, Syn., 1836, p. 32; 1838, p. 22.

* *Margaron* (*Unio*) *fulvus* LEA, Syn., 1852, p. 33; 1870, p. 54.

Cape Fear River, North Carolina; south to Savannah, Georgia.

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[1] I have never seen this species, but should judge from the figure that it groups with *U. crassidens*.

[2] The type is a young shell, and is not the same as adult shells which are in the Lea collection under that name.

† UNIO DARIENSIS Lea.

* *Unio dariensis* LEA, Tr. Am. Phil. Soc., VIII, 1842, p. 246, pl. XXVI, fig. 61; * Pr. Am. Phil. Soc., II, 1843, p. 225; * Obs., III, 1842, p. 84, pl. XXVI, fig. 61.—* CONRAD, Pr. Ac. N. Sci., Phila., VI, 1853, p. 248.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* CHENU, Ill. Conch., 1858, pl. XXXIII, figs. 6, 6*a*, 6*b*.—* SOWERBY, Conch. Icon., XVI, 1868, pl. XCI, fig. 494.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 150.—* SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 413, pl. LIII, fig. 2; LIV, fig. 1.

* *Margaron* (*Unio*) *dariensis* LEA, Syn., 1852, p. 33; 1870, p. 54.

Southeast Georgia to north Florida.

† UNIO MONROENSIS Lea.

Unio monroensis LEA,[1] Desc. of 12 sp. of Uniones, 1843, no pagination; * Tr. Am. Phil. Soc., IX, 1845?, p. 279, pl. XLI, fig. 8; * Obs., IV, 1848, p. 37, pl. XLI, fig. 8.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 252.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 159.—* SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 410, pl. LI, fig. 1.

* *Margaron* (*Unio*) *monroensis* LEA, Syn., 1852, p. 29; 1870, p. 46.

Florida.

† UNIO HARTWRIGHTI[2] B. H. Wright.

† *Unio hartwrighti* B. H. WRIGHT, Naut., IX, 1896, p. 121, pl. II, figs. 4–6.

Lake Beresford, Florida.

UNIO HINKLEYI B. H. Wright.

* *Unio hinkleyi* B. H. WRIGHT, Pr. Ac. N. Sci. Phila., 1888, p. 117, pl. IV, fig. 3[3]; * Check List, 1888.—* SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 423, pl. LXV, fig. 4.

Florida.

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[1] A puzzling form. The type, the only shell in the Lea collection, is rather solid, and the posterior ridge is curved slightly upward in the middle. Other specimens in the museum are less solid, the posterior ridge is sharper, and straight or curved down in the middle, and there seems to be almost a connection with the very different *U. hartwrighti*.

[2] This name was applied to another species by Newcomb, and was used by Wright in the Check List, by Pætel and others, but the form to which it was given was believed to be a synonym of something else, and it was never described. Mr. Wright has again used the name for what is probably a valid species.

[3] The figure of this shell is not at all accurate, being considerably more blunt posteriorly and inflated below than the specimen sent as the type. It approaches *U. monroensis*, but is more elongated, and a series of specimens sent by Mr. Wright almost connects it with *U. dorei*.

†UNIO WEBSTERI B. H. Wright.

* *Unio websteri* B. H. WRIGHT, Pr. Ac. N. Sci. Phila., 1888, p. 113, pl. II, fig. 2[1]; * Check List, 1888.

Florida.

†UNIO DORSATUS Lea.

* *Unio dorsatus* LEA, Pr. Ac. N. Sci. Phila., XII, 1868, p. 160; * Jl. Ac. N. Sci. Phila., VI, 1868, p. 300, pl. XLV, fig. 112; * Obs., XII, 1869, p. 60, pl. XLV, fig. 112.—* B. H. WRIGHT, Check List, 1888.—* SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 411, pl. LI, fig. 7; LII, figs. 1, 2.

* *Margaron* (*Unio*) *dorsatus* LEA, Syn., 1870, p. 37.

Catawba River, North Carolina; Florida.

†UNIO WACCAMAWENSIS Lea.[2]

* *Unio waccamawensis* LEA, Pr. Ac. N. Sci. Phila., VII, 1863, p. 193; * Jl. Acad. N. Sci. Phila., VI, 1866, p. 16, pl. V, fig. 14; * Obs., XI, 1867, p. 20, pl. V, fig. 14.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *waccamawensis* LEA, Syn., 1870, p. 36.

Waccamaw Lake, North Carolina.

(Group of *Unio pigerrimus*.)

Shell rather solid, elliptic rhomboid, somewhat inflated, with a low, rounded posterior ridge, sometimes a little arcuate below, biangulate behind; beaks full, their sculpture a few coarse ridges which are curved upward and swollen where they cross the posterior ridge; surface concentrically striate and often sculptured with curved, subradiating or zigzag corrugations which have a tendency to break into nodules; epidermis brownish; hinge rather heavy; pseudocardinals stumpy, granular; laterals club shaped; muscle scars well marked.

Animal unknown.

UNIO PIGERRIMUS Crosse and Fischer.

* *Unio pigerrimus* CROSSE and FISCHER, Jl. de Conch. XLI, 1893, p. 293.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 582, pl. LXV, figs. 1, 1*a*.

Mexico.

†UNIO MITCHELLI Simpson.

* *Unio mitchelli* SIMPSON (in Dall.), Pr. U. S. Nat. Mus., XVIII, 1896, p. 5; Pr. U. S. Nat. Mus., XIX, 1896, p. 371, pl. XXXII, figs. 1-3.[3]

Southern Texas to New Leon, Mexico.

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[1] Mr. Wright has sent to the Museum under the above name two quite different forms, neither of which is like the figure. From an examination of the first one sent, an old, worn shell, and the figure, I believed it to be a form of *U. obesus* (see Proc. U. S. Nat. Mus., XV, 1892, p. 428). Specimens sent since by Mr. Wright and said to be typical approach *U. hartwrighti*, but are more compressed and elongated. These forms are exceedingly puzzling.

[2] An aberrant species. The shell is inflated, thin, and has a strong posterior ridge. It has characters of both the *Buckleyi* and *Crassidens* groups.

[3] Close to *pigerrimus* apparently, and may be but a variety of it; it is a lighter, longer shell, is less sculptured, and does not have a rose-colored nacre.

† UNIO IHERINGI B. H. Wright.

* *Unio iheringi* B. H. WRIGHT, Naut., XII, 1898, p. 93.—* SIMPSON, Pr. Ac. N. Sci. Phila., 1900, p. 79, pl. IV, fig. 5.

Southern Texas.

† UNIO SPHENORHYNCHUS Fischer and Crosse.

* *Unio sphenorhynchus* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 617, pl. LXVI, figs. 2, 2*a*.

Mexico.

(Group of *Unio liebmanni*.)

Shell rather solid, inflated, ovate rhomboid or trapezoidal, with a well-developed posterior ridge, pointed at or near the base behind, but not biangulate, nearly straight or slightly incurved below; beaks full, sculpture not seen; surface smooth or concentrically striate; epidermis dark, scarcely rayed; hinge rather strong; pseudocardinals heavy, compressed; muscle scars distinct; nacre livid to whitish.

Animal unknown.[1]

† UNIO LIEBMANNI Philippi.

* *Unio liebmanni* PHILIPPI, Zeits. für Mal., IV, 1847, p. 96; * Abbild. und Besch., III, 1849, p. 109, pl. VI, fig. 1.—* KUSTER, Conch. Cab. Unio, 1862, p. 281, pl. XCIV, fig. 7.—* PÆTEL, Conch. Sam., III, 1890, p. 157.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 616.

* *Margaron* (*Unio liebmanni*) LEA, Syn., 1870, p. 48.

* *Unio liebmanni* B. H. WRIGHT, Check List, 1888.

Mexico.

† UNIO OPACATUS Crosse and Fischer.

* *Unio opacatus* CROSSE and FISCHER, Jl. de Conch., XLI, 1893, p. 295.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 592, pl. LXVI, figs. 1, 1*a*.

Mexico.

(Group of *Unio buckleyi*.)

Shell oval, obovate, subtrapezoidal, or elliptical, with a more or less developed posterior ridge, often biangulate behind, compressed or inflated, thin or somewhat solid; beaks generally full, sculptured with several rather strong concentric ridges, which are either nearly parallel with the growth lines or slightly doubly looped; posterior slope often faintly wrinkled; epidermis usually smooth and shining in the younger shells, often rough when old, becoming darker with age, rayed when young. Hinge teeth solid or compressed; nacre mostly brilliant,

[1] This group is exceedingly close to that of *U. buckleyi*, according to the shell characters, and some specimens of *U. liebmanni* are so near others of *U. buckleyi* as to deceive even experts.

of many shades. Animal not differing especially from that of closely related groups.[1]

† UNIO BUCKLEYI Lea.

* *Unio buckleyi*, LEA, Desc. of 12 Uniones, 1843 (no pagination); * Tr. Am. Phil. Soc., IX, 1845 ?, p. 276, pl. XXXIX, fig. 2; * Obs., IV, 1848, p. 34, pl. XXXIX, fig. 2.—* CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 245.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* KUSTER, Conch. Cab. Unio, 1861, p. 177, pl. LVI, fig. 2.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXIV, fig. 175.—* B. H. WRIGHT, Check List, 1888.—* B. H. and S. H. WRIGHT, Conch. Ex., II, 1888, p. 95.—* PÆTEL, Conch. Sam., III, 1890, p. 146.—* SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 417, pl. LVIII, figs. 6, 7; LIX, figs. 1, 2; LX, fig. 2.

* *Margaron* (*Unio*) *buckleyi* LEA, Syn., 1852, p. 30; 1870, p. 48.

*† *Unio buddianus* LEA,[2] Desc. of 12 Uniones, 1843; Tr. Am. Phil. Soc., IX, 1845, ? p. 277, pl. XL, fig. 5; * Obs., IV, 1848, p. 35, pl. XL, fig. 5.—* CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 245.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—* KUSTER, Conch. Cab. Unio, 1861, p. 249, pl. LXXXIV, fig. 1.—* REEVE, Conch. Icon., XVI, 1865, pl. XX, fig. 88.—* B. H. and S. H. WRIGHT, Conch. Ex., II, 1888, p. 95.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 146.

* *Margaron* (*Unio*) *buddianus* LEA, Syn., 1852, p. 32; 1870, p. 52.

*† *Unio dalli* B. H. WRIGHT,[3] Pr. Ac. N. Sci. Phila., 1888, p. 119, pl. VI, fig. 1.—* B. H. WRIGHT, Check List, 1888.

† UNIO BUCKLEYI var. ORCUTTII S. H. Wright.

* *Unio orcuttii* S. H. WRIGHT, West. Am. Sci., IV, 1888, p. 60, 3 figs.[4]

Florida.

† UNIO JAYENSIS Lea.

* *Unio jayensis* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 28, pl IX, fig. 23;[5] * Obs., II. 1838, p. 28, pl. IX, fig. 23.—* TROSCHEL, Arch. für Naturg., V, 1839, Pt. 2, p. 235.—* HANLEY, Test. Moll., 1842, p. 206; * Biv. Shells, 1843, p. 206, pl. XXII, fig. 53.—* CATLOW and REEVE, Conch. Nom., 1845, p. 60.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 251.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p 491.—* CHENU, Ill. Conch., 1858, pl. XXII, figs. 4, 4*a*, 4*b*.—* SOWERBY, Conch.

[1] The relationship between the *Buckleyi*, *Crassidens*, *Complanatus*, *Downiei* and *Fisherianus* groups is very close. That of *Crassidens* is characterized by inflated shells with a strong posterior ridge, and wrinkles on the posterior slope; of *Buckleyi* by a less developed ridge, the absence of strong wrinkles, and a rich, warm texture of shell; of *Complanatus* by trapezoidal, not greatly inflated shells of dull texture. The species of the *Fisherianus* group have elongated, generally compressed, thin shells, pointed behind, and of the *Downiei* assemblage solid, inflated shells. But there are many species that are quite negative in characters, and others that combine the features of two or more groups, that can not be satisfactorily placed.

[2] The type is a large, badly eroded shell, apparently a little injured at the upper, anterior part, and is truncated a little there.

[3] The type is a small, old shell, which has become rough and arcuate.

[4] Credited to Manatee River, Florida, Simpson and Miakka Lake, Florida, Newcomb, by Mr. Wright. I have never found it in the Manatee River, but obtained it in abundance in Miakka Lake.

[5] Although the type is very different from that of *U. buckleyi* the two species approach so closely that there are specimens which I can not name.

Icon., XVI, 1867, pl. LX, fig. 301; LXVII, fig. 343.?—* PÆTEL, Conch. Sam., III, 1890, p. 155.

**Margarita (Unio) jayensis* LEA, Syn., 1836, p. 37; 1838, p. 24.

**Margaron (Unio) jayensis* LEA, Syn., 1852, p. 37.

*† *Unio prasinatus* CONRAD, Am. Jl. Conch., II, 1866, p. 279, pl. XV, fig. 14.—* B. H. WRIGHT, Check List, 1888.

**Margaron (Unio) jayanus* LEA, Syn., 1870, p. 60.

**Unio jayanus* B. H. WRIGHT, Check List, 1888.—* SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 419, pl. LXI, fig. 4.

*† *Unio simpsoni* B. H. WRIGHT[1]; Check List, 1888.

*† *Unio marshii* B. H. WRIGHT, Pr. Ac. N. Sci. Phila., 1888, p. 118, pl. V, fig. 2; Check List, 1888.

*† *Unio tryoni* B. H. WRIGHT, Pr. Ac. N. Sci. Phila., 1888, p. 120, pl. VI, fig. 2; Check List, 1888.

Florida.

† UNIO CORUSCUS Gould.

* *Unio coruscus* GOULD, Pr. Bost. Soc. Nat. Hist., I, 1856, p. 15; * Otia Conch., 1862, p. 222.—* B. H. and S. H. WRIGHT, Conch. Ex., II, 1888, p. 95.—* B. H. WRIGHT, Check List, 1888.—* SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 419, pl. LXIII, figs. 1, 7.

**Margaron (Unio) coruscus* LEA, Syn., 1870, p. 48.

† UNIO CORUSCUS var. FRYANUS B. H. Wright.[2]

Unio fryanus B. H. WRIGHT, Pr. Acad. N. Sci. Phila., 1888, p. 113, pl. II, fig. 1; Check List, 1888.

*† *Unio diazensis* S. H. WRIGHT,[3] Naut., X, 1897, p. 5.

Florida.

† UNIO CUNNINGHAMI B. H. Wright.

* *Unio cunninghami* B. H. WRIGHT, Pr. Ac. N. Sci. Phila., XIII, 1883, p. 58, pl. I, figs. 1–4.—* A. F. GRAY, Am. Nat., XVII, 1883, p. 1184.—* S. H. and B. H. WRIGHT, Conch. Ex., II, 1888, p. 105.—* B. H. WRIGHT, Check List, 1888.—* SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 422, pl. LXV, fig. 6.

Florida.

† UNIO MICANS Lea.

* *Unio micans* LEA, Pr. Ac. N. Sci. Phila., I, 1857, p. 85; *Jl. Ac. N. Sci. Phila., V, 1862, p. 59, pl. III, fig. 207; * Obs., VIII, 1862, p. 63, pl. III, fig. 207.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXV, fig. 182.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 159.—* SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 423, pl. LXV, fig. 3.

**Margaron (Unio) micans* LEA, Syn., 1870, p. 45.

**Unio perlucens* LEA, Pr. Ac. N. Sci. Phila., VII, 1863, p. 193; * Jl. Ac. N. Sci. Phila.,

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[1] From an examination of specimens sent to the U. S. National Museum by Mr. Wright I referred this to *U. buckleyi*, in Pr. U. S. Nat. Mus., XV, p. 417. The type is now in the U. S. National Museum, and I believe it to be a rather compressed, bright young *U. jayensis*.

[2] A form of *coruscus* a little less solid and inflated than the type, and quite brilliant.

[3] This name occurs in B. H. Wright's Check List, but the species was not described until 1897. It scarcely differs from *U. fryanus*.

VI, 1866, p. 18, pl. v, fig. 16; Obs., XI, 1867, p. 22, pl. v, fig. 16.—* B. H. WRIGHT, Check List, 1888.

* *Margaron (Unio) perlucens* LEA, Syn., 1870, p. 45.

North Carolina to South Georgia and Florida.

†UNIO PYGMÆUS Lea.[1]

* *Unio pygmæus* LEA, Pr. Am. Phil. Soc., V, 1852, p. 252; * Tr. Am. Phil. Soc., X, 1852, p. 262, pl. XV, fig. 14; * Obs., V, 1852, p. 18, pl. XV, fig. 14; * CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 256.—* B. H. WRIGHT, Check List, 1888.

* *Margaron (Unio) pygmæus* LEA, Syn., 1870, p. 48.

Abbeville District, South Carolina.

†UNIO LEHMANII, S. H. Wright.

* *Unio lehmanii*, S. H. WRIGHT, Naut., X, 1897, p. 138.—* SIMPSON, Pr. Acad. N. Sci. Phila., 1900, p. 80, pl. IV, fig. 9.

St. Marys River, Florida.

†UNIO BURTCHIANUS S. H. Wright.

* *Unio burtchianus* S. H. WRIGHT, Naut., X, 1897, p. 137.—* SIMPSON, Pr. Ac. N. Sci. Phila., 1900, p. 80, pl. IV, fig. 8.

St. Mary's River, Florida.

†UNIO CONFERTUS Lea.[2]

* *Unio lugubris* LEA, Tr. Am. Phil. Soc., VI, 1834, p. 30, pl. IX, fig. 25; * Obs., II, 1838, p. 30, pl. IX, fig. 25.—* TROSCHEL, Arch. für Naturg., V, 1839, Pt. 2, p. 235.—* HANLEY, Test. Moll., 1842, p. 206; * Biv. Shells, 1843, p. 206, pl. XXII, fig. 9.—* CHENU, Bib. Conch., 1st ser., III, 1845, p. 53, pl. XV, figs. 1, 1*a*.—* CATLOW and REEVE, Conch. Nom., 1845, p. 60.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 252.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—* CHENU, Ill. Conch., 1858, pl. XX, figs. 3, 3*a*, 3*b*.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXX, fig. 423.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 158.—* SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 424, pl. LXVI, fig. 4; LXVII, fig. 1.

* *Margarita (Unio) lugubris* LEA, Syn., 1836, p. 37; 1838, p. 24.

* *Margaron (Unio) lugubris* LEA, Syn., 1852, p. 38; 1870, p. 53.

*† *Unio confertus* LEA, Tr. Am. Phil. Soc., V, 1834, p. 103, pl. XVI, fig. 47; * Obs., I, p. 215, pl. XVI, fig. 47.—* FERUSSAC, Guer. Mag., 1835, p. 29.—* HANLEY, Test. Moll., 1842, p. 200; * Biv. Shells, 1843, p. 200, pl. XXIII, fig. 34.—* CATLOW and REEVE, Conch. Nom., 1845, p. 57.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXV, fig. 185.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 148.

* *Margarita (Unio) confertus* LEA, Syn., 1836, p. 31; 1838, p. 22.

* *Margaron (Unio) confertus* LEA, Syn., 1852, p. 33; 1870, p. 53.

*† *Unio geddingsianus* LEA, Pr. Am. Phil. Soc. I, 1840, p. 285; * Tr. Am. Phil. Soc., VIII, 1842, p. 202, pl. XI, fig. 15; * Obs., III, 1842, p. 40, pl. XI, fig. 15.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 250.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* CHENU, Ill. Conch., 1858, pl. XXXI, figs. 3, 3*a*, 3*b*.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 153.

* *Margaron (Unio) geddingsianus* LEA, Syn., 1852, p. 33; 1870, p. 53.

[1] Only a single broken right valve of this is in the Lea collection.

[2] The name *lugubris* applied first to this species will have to give way to *confertus* because Say used *lugubris* at an earlier date for a *Unio*.

* *Unio limatulus* CONRAD, Pr. Ac. N. Sci. Phila., IV, 1849, p. 154; * Ann. and Mag., IV, 1849, p. 301; * Jl. Ac. N. Sci. Phila., I, 1850, p. 276, pl. XXXVII, fig. 9; * Pr. Ac. N. Sci. Phila., VI, 1853, p. 251.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 157.

* *Margaron* (*Unio*) *limatulus* LEA, Syn., 1852, p. 32; 1870, p. 52.

* † *Unio whiteianus* LEA, Tr. Am. Phil. Soc., X, 1852, p. 258, pl. XIV, fig. 8.—* Obs., V, 1852, p. 14, pl. XIV, fig. 8.—* H. and A. ADAMS, Gen., Rec. Moll., II, 1857, p. 493.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 172.

* *Margaron* (*Unio*) *whiteianus* LEA, Syn., 1852, p. 33; 1870, p. 53.

* *Unio vibex* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 260.[1]

* † *Unio similis* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 169; * Jl. Ac. N. Sci. Phila., IV, 1858, p. 91, pl. XIX, fig. 71; * Obs., VI, 1858, p. 91, pl. XIX, fig. 71.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 167.

* *Margaron* (*Unio*) *similis* LEA, Syn., 1852, p. 52; 1870, p. 53.

* † *Unio protensus* LEA, Pr. Ac. N. Sci. Phila., IX, 1865, p. 88; * Jl. Ac. N. Sci. Phila., VI, 1868, p. 256, pl. XXXI, fig. 71; * Obs., XII, 1869, p. 16, pl. XXXI, fig. 71.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *protensus* LEA, Syn., 1870, p. 60.

* † *Unio radiolus* LEA, Pr. Ac. N. Sci. Phila., I, 1871, p. 192; * Jl. Ac. N. Sci. Phila., VIII, 1874, p. 21, pl. VI, fig. 18; * Obs., XIII, 1874, p. 25, pl. VI, fig. 18.—* B. H. WRIGHT, Check List, 1888.

North Carolina to Florida.

† UNIO INSULSUS Lea.

* *Unio insulsus* LEA, Pr. Ac. N. Sci. Phila., I, 1857, p. 86; * Jl. Ac. N. Sci. Phila., IX, 1862, p. 53, pl. I, fig. 199; * Obs., VIII, 1862, p. 57, pl. I, fig. 199.—* B. H. WRIGHT, Check List, 1888.—* SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 422, pl. LXV, figs. 1, 5.

* *Margaron* (*Unio*) *insulsus* LEA, Syn., 1870, p. 53.

* † ? *Unio lucidus* LEA,[2] Pr. Ac. N. Sci. Phila., VII, 1863, p. 192; * Jl. Ac. N. Sci. Phila., VI, 1866, p. 9, pl. II, fig. 6; * Obs., XI, 1867, p. 13, pl. II, fig. 6.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *lucidus* LEA, Syn , 1870, p. 48.

* † *Unio cistelliformis* LEA, Pr. Ac. N. Sci. Phila., VII, 1863, p. 192; * Jl. Ac. N. Sci. Phila., VI, 1866, p. 19, pl. VI, fig. 17; * Obs., XI, 1867, p. 23, pl. VI, fig. 17.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *cistelliformis* LEA, Syn., 1870, p. 52.

North Carolina to Florida.

† UNIO OBNUBILUS Lea.

* *Unio obnubilus* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 169; * Jl. Ac. N. Sci. Phila., IV, 1858, p. 84, pl. XVII, fig. 64; * Obs., VI, 1858, p. 84, pl. XVII, fig. 64.—* SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 424, pl. LXVI, fig. 3.

* *Margaron* (*Unio*) *obnubilus* LEA, Syn., 1870, p. 53.

* † *Unio opacus* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 169; * Jl Ac. N. Sci. Phila., IV, 1858, p. 86, pl. XVIII, fig. 66; * Obs., VI, 1858, p. 86, pl. XVIII, fig. 66.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch Sam., III, 1890, p. 161.

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[1] Conrad here states that his *vibex* = first *whiteianus* of Lea, and then *zeiglerianus* of Lea. The latter is totally different from *whiteianus*.

[2] Very near *U. confertus*. It is probably a delicate, light-colored, rayed *insulsus*.

**Margaron* (*Unio*) *opacus* LEA, Syn., 1870, p. 52.

*†*Unio æquatus* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 170; *Jl. Ac. N. Sci. Phila., 1858, p. 89, pl. XIX, fig. 69; *Obs., VI, 1858, p. 89, pl. XIX, fig. 69.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *æquatus* LEA, Syn., 1870, p. 52.

*†*Unio viridicatus* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 170; *Jl. Ac. N. Sci. Phila., IV, 1858, p. 87, pl. XVIII, fig. 67; *Obs., VI, 1858, pl XVIII, fig. 67.

**Margaron* (*Unio*) *viridicatus* LEA, Syn., 1870, p. 52.

*†*Unio hepaticus* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 154; *Jl. Ac. N. Sci. Phila., IV, 1860, p. 348, pl. LVII, fig. 173; *Obs., VIII, p. 30, pl. LVII, fig. 173.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 154.

**Margaron* (*Unio*) *hepaticus* LEA, Syn., 1870, p. 52.

*†*Unio santeensis* LEA, Pr. Ac. N. Sci. Phila., I 1871, p. 193.—*Jl. Ac. N. Sci. Phila., VIII, 1874, p. 20, pl. VI, fig. 17; *Obs., XIII, 1874, p. 24, pl. VI, fig. 17.—*B. H. WRIGHT, Check List, 1888.

*†*Unio nolani* B. H. WRIGHT, Pr. Ac. N. Sci. Phila., 1888, p. 116, pl. IV, fig. 11; Check List, 1888.

South Carolina to Florida.

†UNIO FUSCATUS Lea.

**Unio fuscatus* LEA, Desc. 12 Uniones, 1843 (no pagination).—*Tr. Am. Phil. Soc., IX, 1845?, p. 277, pl. XL, fig. 4; Obs., IV, 1848, p. 35, pl. XL, fig. 4.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 250.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—*KUSTER, Conch. Cab. Unio, 1848, p. 203, pl. LXVIII, fig. 2.—*REEVE, Conch. Icon., XVI, 1865, pl. XXI, fig. 95.—*PÆTEL, Conch. Sam., III, 1890, p. 153.—*SIMPSON, Pr. U. S. Nat. Mus., XVI, 1892, p. 420, pl. LXIII, figs. 2, 4.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *fuscatus* LEA, Syn., 1852, p. 30; 1870, p. 48.

Florida.

†UNIO OCCULTUS Lea.

**Unio occultus* LEA, Desc. 12 Uniones, 1843 (no pagination).—Tr. Am. Phil. Soc., IX, 1845?, p. 279, pl. XLI, fig. 7; *Obs., IV, 1848, p. 37, pl. XLI, fig. 7.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—*KUSTER, Conch. Cab. Unio, 1861, p. 223, pl. LXXV, fig. 3.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 161.—*SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 420, pl. LXIII, figs. 5, 6.

**Margaron* (*Unio*) *occultus* LEA, Syn., 1852, p. 48; 1870, p. 48.

Florida.

†UNIO ARCTATUS Conrad.

**Unio arctatus* CONRAD, Am. Jl. Sci., XXV, 1834, p. 340, pl. I, fig. 9; *New F. W. Shells, 1834, p. 36, pl. V, fig. 4, p. 67.—*MÖLLER, Syn. Nov. Gen., 1836, p. 200.—*HANLEY, Test. Moll., 1842, p. 207; *Biv. Shells, 1843, p. 207, pl. XXIII, fig. 47.—*CATLOW and REEVE, Conch. Nom., 1845, p. 56.—*CHENU, Bib. Conch., 1st ser., III, 1845, p. 19, pl. III, fig. 10.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 245.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—*KUSTER, Conch. Cab. Unio, 1861, p. 195, pl. LXII, fig. 3.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 144.

**Margarita* (*Unio*) *arctatus* LEA, Syn., 1836, p. 38; 1838, p. 25.

**Margaron* (*Unio*) *arctatus* LEA, Syn., 1852, p. 38; 1870, p. 62.

†UNIO ARCTATUS var. TORTIVUS Lea.

*†*Unio tortivus* LEA,[1] Pr. Am. Phil. Soc., I, 1840, p. 287; Tr. Am. Phil. Soc., VIII, 1842, p. 204, pl. XII, fig. 17; Obs., III, 1842, p. 42, pl. XII, fig. 17.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 259.—H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* CHENU, Ill. Conch., 1858, pl. XXIX, figs. 6, 6*a*, 6*b*.—*SOWERBY, Conch. Icon., XVI, 1866, pl. XXXVI, fig. 193.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 169.—*SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 421, pl. LXIII, fig. 8; LXIV, figs. 1, 3, 4.

**Margaron* (*Unio*) *tortivus* LEA, Syn., 1852, p. 33; 1870, p. 53.

*†*Unio tetricus* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 170; *Jl. Ac. N. Sci. Phila., IV, 1859, p. 195, pl. XXII, fig. 78; * Obs., VII, 1859, p. 13, pl. XXII, fig. 78.—*KUSTER, Conch. Cab. Unio, 1862, p. 276, pl. XCI, fig. 7; XCIII, fig. 3.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 169.

**Margaron* (*Unio*) *tetricus* LEA, Syn., 1870, p. 53.

*†*Unio purpurellus* LEA,[2] Pr. Ac. N. Sci. Phila., IX, 1857, p. 171; *Jl. Ac. N. Sci. Phila., IV, 1859, p. 19, pl. XXIII, fig. 81; *Obs., VII, 1859, p. 16, pl. XXIII, fig. 81.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *purpurellus* LEA, Syn., 1870, p. 53.

*† *Unio merceri* LEA, Pr. Ac. N. Sci. Phila., VI, 1862, p. 169; *Jl. Ac. N. Sci. Phila., V, 1862, p. 209, pl. XXXI, fig. 278; * Obs., IX, 1863, p. 31, pl. XXXI, fig. 278.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 159.

* *Margaron* (*Unio*) *merceri* LEA, Syn., 1870, p. 61.

Florida; South Georgia; the type west to the Black Warrior River, Alabama.

†UNIO NIGELLUS Lea.

* *Unio nigellus* LEA, Pr. Am. Phil. Soc., V, 1852, p. 251; * Tr. Am. Phil. Soc., X, 1852, p. 283, pl. XXIV, fig. 42; * Obs., V, 1852, p. 39, pl. XXIV, fig. 42.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 253.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 161.

* *Margaron* (*Unio*) *nigellus* LEA, Syn., 1852, p. 30; 1870, p. 53.

*† *Unio denigratus* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 171; *Jl. Ac. N. Sci. Phila., IV, 1859, p. 200, pl. XXIII, fig. 83; *Obs., VII, 1859, p. 18, pl. XXIII, fig. 83.—* B. H. WRIGHT, Check List, 1888.—* SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 422, pl. LXV, fig. 1.

**Margaron* (*Unio*) *denigratus* LEA, Syn., 1870, p. 52.

Chattahoochee River system; south into Florida.

†UNIO PINEI B. H. Wright.

**Unio pinei* B. H. WRIGHT, Naut., XI, 1897, p. 40.—* SIMPSON, Pr. Ac. N. Sci. Phila., 1900, p. 80, pl. III, fig. 1.

North Florida.

[1] *Unio arctatus* is a widely distributed, abundant, and variable species, ranging from the Black Warrior River to southern Florida. I have examined a great amount of material from the Black Warrior and Cahawba rivers (collected by Call), from the Flint and Chattahoochee rivers from the Lea and other collections, and I feel reasonably sure that all the species I have united should go together.

[2] I believe this to be a small, somewhat inflated form of *arctatus*.

† UNIO OSCARI B. H. Wright.

* *Unio oscari* B. H. WRIGHT, Naut., V, 1892, p. 124; IX, 1896, p. 122, pl. II, figs. 1-3.

Florida.

† UNIO HAZELHURSTIANUS Lea.

' *Unio hazelhurstianus* LEA, Pr. Ac. N. Sci. Phila., II, 1858, p. 166; ' Jl. Ac. N. Sci. Phila., IV, 1859, p. 211, pl. XXVI, fig. 92; ' Obs., VII, 1859, p. 29, pl. XXVI, fig. 92.—' SOWERBY, Conch. Icon., XVI, 1866, pl. XXXV, fig. 188.—' B. H. WRIGHT, Check List, 1888.—' PÆTEL, Conch. Sam., III, 1890, p. 154.

' *Margaron* (*Unio*) *hazelhurstianus* LEA, Syn., 1870, p. 60.

Southern Georgia.

† UNIO BUXTONI B. H. Wright.

* *Unio buxtoni* B. H. WRIGHT, Naut., XI, 1897, p. 55 —' SIMPSON, Pr. Ac. N. Sci. Phila., 1900, p. 80, pl. I, fig. 6.

Marion County, Florida.

† UNIO FERRISSII Marsh.

* *Unio ferrissii* MARSH, Naut., V, 1891, p. 30.[1]—' SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 423, pl. LXVI, figs. 1, 2.

Small creek near Palatka, Florida.

† UNIO DOREI B. H. Wright.

* *Unio dorei* B. H. WRIGHT,[2] Pr. Ac. N. Sci. Phila., 1888, p. 115, pl. III, fig. 1.

Lake Monroe, Florida.

(Group of *Unio striatulus.*)

Shell subsolid, rhomboid oval, with a well-developed post ridge ending in a point below; beaks full, with numerous subparallel, slightly corrugated, strong ridges; epidermis rayless or faintly rayed, with a few wrinkles on the posterior slope; pseudocardinals stumpy; laterals straight. Animal unknown.

† UNIO STRIATULUS Lea.

* *Unio striatulus* LEA, Pr. Acad. N. Sci. Phila., I, 1857, p. 86; ' Jl. Acad. N. Sci. Phila., V, 1862, p. 55, pl. II, fig. 202.—' Obs., VIII, 1862, p. 59, pl. II, fig. 202.—' SOWERBY, Conch. Icon., XVI, 1868, pl. LXXII, fig. 367.—' B. H. WRIGHT, Check List, 1888.—' PÆTEL, Conch. Sam., III, 1890, p. 168.

' *Margaron* (*Unio*) *striatulus*, LEA, Syn., 1870, p. 37.

Roanoke River; Welden and Salem, North Carolina.

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[1] This was first published in the Joliet Weekly News, a newspaper, May 1, 1891. It is a puzzling form, having something the shape of the variety *orcutti* of *U. buckleyi*, but has plications on the posterior slope such as are found in the *Crassidens* group.

[2] I do not know where to place this form, of which I have only seen the type. The figure is not very accurate, and I formerly thought it a variety of *U. buckleyi*, but on seeing the type I believe it is not that. It seems to combine characters of the *Buckleyi* and *Crassidens* groups.

† UNIO AMABILIS Lea.

* *Unio amabilis* LEA, Pr. Acad. N. Sci. Phila., IX, 1865, p. 89; * Jl. Acad. N. Sci. Phila., VI, 1869, p. 257, pl. XXXI, fig. 72; * Obs., XII, 1869, p. 17, pl. XXXI, fig. 72.—* B. H. Wright, Check List, 1888.

* *Margaron (Unio) amabilis* LEA, Syn., 1870, p. 37.

Butler, Taylor County, Georgia; North Carolina?

UNIO SUBPLANUS Conrad.

Unio subplanus CONRAD, Monog., IX, 1837, p. 73, pl. XLI, fig. 1; * Pr. Ac. N. Sci. Phila., VI, 1853, p. 258.—* HANLEY, Biv. Shells, Supp., 1856, p. 383, pl. XXI, fig. 16.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* KUSTER, Conch. Cab. Unio, 1862, p. 272, pl. XCI, fig. 5.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 168.

* *Margaron (Unio) subplanus* LEA, Syn., 1852, p. 33; 1870, p. 54.

* *Unio subplanum* SOWERBY, Conch. Icon., XVI, 1866, pl. XLVII, fig. 252.

North Carolina and Virginia.

UNIO BRIMLEYI S. H. Wright.

* *Unio brimleyi* S. H. WRIGHT, Naut., X, 1897, p. 138; * SIMPSON, Pr. Ac. N. Sci. Phila., 1900, p. 80, pl. IV, fig. 6.

Neuse River and Irwin's Creek, North Carolina.

(Group of *Unio complanatus*.)

Shell elongate trapezoidal, moderately solid, but little inflated, nearly straight below, with a posterior ridge, usually biangulate behind; beaks not prominent, sculptured with several coarse, parallel ridges which follow the growth lines or are nearly straight. Epidermis sometimes shining and feebly rayed, becoming rough and rayless with age; laterals straight or slightly curved; beak cavities shallow.

Animal with the marsupium occupying all or nearly all of the outer branchiæ; gills long, rounded below, inner much the larger, free nearly or quite their whole length from the abdominal sac.

† UNIO COMPLANATUS (Solander) Dillwyn.[1]

Mya complanata SOLANDER, manuscript (no date).—* PORTLAND catalogue, 1786, p. 100, Lot 2190.—* DILLWYN, Cat., I, 1817, p. 51.

* *Unio complanata* DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 559; 3d ed., II, 1839, p. 676.

[1] This species was described by Solander in Latin, but the manuscript was never published and is now in the British Museum. Mr. Edgar A. Smith kindly examined it for me and informed me that Dillwyn's description in the catalogue is a translation from Solander. The name *Mya complanata* was used by Lister in Hist. Sive. Conch. (1770, p. 150), but Lister was not a binomial author. The Portland catalogue is anonymous, and a mere sale list. I have done my best to straighten out the synonymy of this variable and exceedingly puzzling group, and have examined nearly all the types and a great amount of material. In some cases, as in the *Buckleyi* group, there seem to be no specific lines whatever.

* *Unio complanatus* FERUSSAC, Guer. Mag., 1835, p. 26.—* GOULD, Inv. of Mass., 1841, p. 107, figs. 68-70.—* BINNEY, 2d ed., Inv. of Mass., 1870, p. 167, fig. 472.—* C. B. ADAMS, Thompson's Hist. Vt., 1842, p. 167.—* HANLEY, Test. Moll., 1842, p. 199; * Biv. Shells, 1843, p. 199, pl. XXI, fig. 20.—* DE KAY, Zool. of N. Y., Pt. 5, 1843, p. 188, pl. XXII, fig. 246.—* CATLOW and REEVE, Conch. Nom., 1845, p. 57.—* STIMPSON, Shells of N. Eng., 1851, p. 13.—* AGASSIZ, Arch. für Nat., I, 1852, p. 50.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 247.—KUSTER, Conch. Cab. Unio, 1856, p. 137, pl. XLI, fig. 2.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* HARTMAN and MICHENER, Conch. Cest., 1874, p. 86, fig. 181.—* LATCHFORD, Tr. Ottawa Field Nat. Cl., 1882, p. 49.—* B. H. WRIGHT, Check List, 1888.—* H. CARPENTER, Naut., III, 1889, p. 93.—* PÆTEL, Conch. Sam., III, 1890, p. 148.

* *Margarita* (*Unio*) *complanatus* LEA, Syn., 1836, p. 30; 1838, p. 22.

* *Margaron* (*Unio*) *complanatus* LEA, Syn., 1852, p. 32; 1870, p. 51.

* ? *Unio violaceus* SPENGLER, Skriv. Nat. Selsk. III, 1793, p. 55.

* ? *Unio purpureus* SAY, Nich. Enc., II, 1816, pl. III, fig. 1; N. Harm. Diss., II, No. 21, 1829, p. 324.—* CONRAD, New F. W. Shells, 1834, p. 71.—* SOWERBY, Rich. Faun. Boreali Am., III, 1836, p. 316.—* L. W. SAY, Terr. and Fluv. Shells, 1840, p. 7.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXVIII, fig. 346.

* *Mya purpurea* EATON, Zool. Text-Book, 1826, p. 2.

* ? *Unio purpurea* DESHAYES, Encyc. Méth. II, 1827, p. 151, pl. 249, fig. 5.

* *Unio rarisulcata* LAMARCK, An. sans Vert., VI, 1819, p. 72.—* LEA, Obs., I, 1834, p. 200.—DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 534.

* *Unio coarctata* LAMARCK, An. sans Vert., VI, 1819, p. 73.—* LEA, Obs., I, 1834, p. 200.—DESHAYES, Encyc. Méth., II, 1830, p. 581; * An. sans Vert., 2d ed., VI, 1835, p. 535; 3d ed., II, 1839, p. 668.—* ? SOWERBY, Conch. Icon., XVI, 1866, pl. XXXIV, fig. 178.

* *Unio purpurascens* LAMARCK, An. sans Vert., VI, 1819, p. 73.—DESHAYES, Enc. Méth., II, 1830, p. 581.—* LEA, Obs., I, 1834, p. 200.—DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 535; 3d ed., II, 1839, p. 668.

* *Unio georgiana* LAMARCK, An. sans Vert., VI, 1819, p. 74.—* LEA, Obs., I, 1834, p. 201.—DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 536; 3d ed., II, 1839, p. 668.

* *Unio rhombula* LAMARCK, An. sans Vert., VI, 1819, p. 74.—* DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 536; 3d ed., II, 1839, p. 668.

* *Unio rhombula* LAMARCK, An. sans Vert., VI, 1819, p. 74.—* LEA, Obs., I, 1834, p. 200.—* DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 536; 3d ed., II, 1839, p. 668.—* ? DELESSERT, Rec. Coq. Sam., 1841, pl. XII, fig. 8.

* *Unio carinifera* LAMARCK, An. sans Vert., VI, 1819, p. 74.—* LEA, Obs., I, 1834, p. 201.—DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 536; 3d ed., II, 1839, p. 668.—* KUSTER, Conch. Cab. Unio, 1861, p. 176, pl. LVI, fig. 1.

* *Unio glabrata* LAMARCK, An. sans Vert., VI, 1819, p. 75.—* LEA, Obs., I, 1834, p. 201.—DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 537; 3d ed., II, 1839, p. 669.

* *Unio sulcidens* LAMARCK, An. sans Vert., VI, 1819, p. 77.—* LEA, Obs., I, 1834, p. 202.—DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 539; 3d ed., II, 1839, p. 670.—* ? DELESSERT, Rec. Coq. Sam., 1841, pl. XII, fig. 3.—* CHENU, Ill. Conch., 1858, pl. XII, figs. 5, 5*a*.

* *Unio virginiana* LAMARCK, An. sans Vert., VI, 1819, p. 79.—DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 544; 3d ed., II, 1839, p. 671.

Unio fluviatilis GREEN, Jl. Mac. Lyceum, 1827, p. 41.

* ? *Unio raveneli* CONRAD, New F. W. Shells, 1834, p. 39, pl. VI, fig. 4,[1] p. 71.—* FERUSSAC, Guer. Mag., 1835, p. 29.—* MÖLLER, Syn. Nov. Gen., 1836, p. 206.—

[1] It is hard to say what this is. The figure is like *complanatus*, but the shell, which is labeled *raveneli* Conrad and is in the Philadelphia Academy of Natural Sciences, is like *lugubris*.

* CHENU, Bib. Conch., 1st ser., III, p. 9, pl. III, fig. 8.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 256.—* B. H. WRIGHT, Check List, 1888.

* *Margarita* (*Unio*) *watereensis* LEA, Syn., 1836, p. 31;[1] 1838, p. 22.

* *Margaron* (*Unio*) *watereensis*, LEA, Syn., 1852, p. 33; 1870, p. 53.

* *Unio watereensis*, H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—PÆTEL, Conch. Sam., III, 1890, p. 172.

* † *Unio griffithianus*, LEA, Tr. Am. Phil. Soc., V, 1834, p. 103, pl. XV, fig. 46; Obs., I, 1834, p. 215, pl. XV, fig. 46.—* FERUSSAC, Guer. Mag., 1835, p. 29.—* HANLEY, Test. Moll., 1842, p. 199; * Biv. Shells, 1843, p. 199, pl. XXIII, fig. 28.—* CATLOW and REEVE, Conch. Nom., 1845, p. 59.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 250.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* KUSTER, Conch. Cab. Unio, 1861, p. 208, pl. LXIX, fig. 2.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXIX, fig. 449.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 154.

* *Margarita* (*Unio*) *griffithianus*, LEA, Syn., 1836, p. 31; 1838, p. 22.

* *Margaron* (*Unio*) *griffithianus*, LEA, Syn., 1852, p. 33; 1870, p. 52.

* † *Unio planilaterus*, CONRAD, Monog., XII (no date after 1838), p. 103, pl. LVII, fig. 1; Pr. Ac. N. Sci. Phila., VI, 1853, p. 255.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 163.

* *Margaron* (*Unio*) *planilaterus*, LEA, Syn., 1870, p. 51.

* † *Unio fuliginosus*, LEA, Pr. Am. Phil. Soc., IV, 1845, p. 164; Tr. Am. Phil. Soc., X, 1848, p. 78, pl. VII, fig. 19.

* † *Unio rufusculus* LEA, Pr. Am. Phil. Soc., V, 1852, p. 252; * Tr. Am. Phil. Soc., X, 1852, p. 258, pl. XIV, fig. 7; * Obs., V, 1852, p. 14, pl. XIV, fig. 7.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 257.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXIII, fig. 377.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 166.

* *Margaron* (*Unio*) *rufusculus* LEA, Syn., 1852, p. 33; 1870, p. 54.

* *Mya rigida* WOOD, Ind. Test. Rev., 1856, p. 200, pl. 1, supp. fig. 10.

* † *Unio abbevillensis* LEA, Pr. Ac. N. Sci. Phila., I, 1857, p. 84; * Jl. Ac. N. Sci. Phila., IV, 1858, p. 51, pl. VI, fig. 34; * Obs., VI, 1858, p. 51, pl. VI, fig. 34.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 143.

* *Margaron* (*Unio*) *abbevillensis* LEA, Syn., 1870, p. 52.

* † *Unio contractus* LEA, Pr. Ac. N. Sci. Phila., I, 1857, p. 86; * Jl. Ac. N. Sci. Phila., V, 1862, p. 203, pl. XXIX, fig. 272; * Obs., IX, p. 25, pl. XXIX, fig. 272.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *contractus* LEA, Syn., 1870, p. 61.

* † *Unio virens* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 169; * Jl. Ac. N. Sci. Phila., IV, 1858, p. 80, pl. XVI, fig. 60; * Obs., VI, 1858, p. 80, pl. XVI, fig. 60.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *virens* LEA, Syn., 1870, p. 52.

* † *Unio savannahensis* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 169; * Jl. Ac. N. Sci. Phila., IV, 1858, p. 81, pl. XVI, fig. 61; * Obs., VI, 1858, p. 81, pl. XVI, fig. 61.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *savannahensis* LEA, Syn., 1870, p. 51.

* † *Unio subflavus* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 170; * Jl. Ac. N. Sci. Phila., IV, 1858, p. 90, pl. XIX, fig. 70; * Obs., VI, 1858, p. 90, pl. XIX, fig. 70.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *subflavus* LEA, Syn., 1870, p. 52.

* † *Unio neusensis* LEA, Pr. Ac. N. Sci. Phila., II, 1858, p. 41; * Jl. Ac. N. Sci. Phila., V, 1859, p. 60, pl. IV, fig. 208; * Obs., VIII, 1860, p. 64, pl. IV, fig. 208.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *neusensis* LEA, Syn., 1870, p. 51.

[1] Lea changed the name *raveneli* to *watereensis*, because the name *ravenelianus* had been applied by him to a *Unio*.

*† *Unio exactus* LEA, Pr. Ac. N. Sci. Phila., II, 1858, p. 41; *Jl. Ac. N. Sci. Phila., V, 1862, p. 62; *Obs., VIII, 1860, p. 66, pl. IV, fig. 210.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *exactus* LEA, Syn., 1870, p. 43.

*† *Unio roswellensis* LEA, Pr. Ac. N. Sci. Phila., II, 1858, p. 165; *Jl. Ac. N. Sci. Phila., IV, 1859, p. 205, pl. XXIV, fig. 87; *Obs., VII, 1859, p. 23, pl. XXIV, fig. 87.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *roswellensis* LEA, Syn., 1870, p. 51.

*† *Unio postellii* LEA, Pr. Ac. N. Sci. Phila., II, 1858, p. 165; *Jl. Ac. N. Sci. Phila., IV, 1859, p. 214, pl. XXVI, fig. 94; *Obs., VII, 1859, p. 32, pl. XXVI, fig. 94.—*SOWERBY, Conch. Icon., XVI, 1866, pl. XLVII, p. 255.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *postellii* LEA, Syn., 1870, p. 51.

*† *Unio baldwinensis* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 170; *Jl. Ac. N. Sci. Phila., IV, 1860, p. 330, pl. LI, fig. 155; *Obs., VIII, 1860, p. 12, pl. LI, fig. 155.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *baldwinensis* LEA, Syn., 1870, p. 51.

*† *Unio raeensis* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 171; *Jl. Ac. N. Sci. Phila., IV, 1860, p. 331, pl. LII, fig. 156; *Obs., VIII, 1860, p. 13, pl. LII, fig. 156.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *raeensis* LEA, Syn., 1870, p. 52.

*† *Unio quadratus* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 172; *Jl. Ac. N. Sci. Phila., IV, 1860, p. 338, pl. LIV, fig. 163; *Obs., VIII, 1860, p. 20, pl. LIV, fig. 163.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *quadratus* LEA, Syn., 1870, p. 54.

*† *Unio squameus* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 391; *Jl. Ac. N. Sci. Phila., V, 1862, p. 200, pl. XXVIII, fig. 269; *Obs., IX, 1863, p. 22, pl. XXVIII, fig. 269.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *squameus* LEA, Syn., 1870, p. 51.

**Unio lugubris* KUSTER, Conch. Cab. Unio, 1861, p. 234, pl. LXXIX, fig. 1.

*† *Unio weldonensis* LEA, Pr. Ac. N. Sci. Phila., VII, 1863, p. 191; *Jl. Ac. N. Sci. Phila., VI, 1866, p. 11, pl. III, fig. 8; *Obs., XI, 1867, p. 15, pl. III, fig. 8.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *weldonensis* LEA, Syn., 1870, p. 51.

*† *Unio gastonensis* LEA, Pr. Ac. N. Sci. Phila., VII, 1863, p. 191; *Jl. Ac. N. Sci. Phila., VI, 1866, p. 20, pl. VI, fig. 18; *Obs., XI, 1867, p. 24, pl. VI, fig. 18.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *gastonensis* LEA, Syn., 1870, p. 51.

*† *Unio aberrans* LEA, Pr. Ac. N. Sci. Phila., VII, 1863, p. 191; *Jl. Ac. N. Sci. Phila., VI, 1866, p. 7, pl. I, fig. 3; *Obs., XI, 1867, p. 11, pl. I, fig. 3.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *aberrans* LEA, Syn., 1870, p. 52.

*† *Unio mecklenbergensis* LEA, Pr. Ac. N. Sci. Phila., VII, 1863, p. 191; *Jl. Ac. N. Sci. Phila., VI, 1866, p. 17, pl. V, fig. 15; *Obs., XI, 1867, p. 21, pl. V, fig. 15.—*B. H. WRIGHT, Check List, 1888.

Margaron (*Unio*) *mecklenbergensis* LEA, Syn., 1870, p. 51.

*† *Unio raleighensis* LEA, Pr. Ac. N. Sci. Phila., VII, 1863, p. 191; *Jl. Ac. N. Sci. Phila., VI, 1866, p. 6, pl. I, fig. 2; *Obs., XI, 1867, p. 10, pl. I, fig. 2.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *raleighensis* LEA, Syn., 1870, p. 52.

*† *Unio mediocris* LEA, Pr. Ac. N. Sci. Phila., VII, 1863, p. 192; *Jl. Ac. N. Sci. Phila., VI, 1866, p. 24, pl. VII, fig. 22; *Obs., XI, 1867, p. 28, pl. VII, fig. 22.

**Margaron* (*Unio*) *mediocris* LEA, Syn., 1870, p. 52.

*† *Unio indefinitus* LEA, Pr. Ac. N. Sci. Phila., VII, 1863, p. 192; *Jl. Ac. N. Sci. Phila., VI, 1866, p. 15, pl. IV, fig. 12; *Obs., XI, 1867, p. 12, pl. IV, fig. 112.—*B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *indefinitus* LEA, Syn., 1870, p. 51.

*† *Unio humerosus* LEA, Pr. Ac. N. Sci. Phila., XII, 1868, p. 161; *Jl. Ac. N. Sci. Phila., VI, 1868, p. 301, pl. XLV, fig. 113; *Obs., XII, 1869, p. 61, pl. XLV, fig. 113.—*B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *humerosus* LEA, Syn., 1870, p. 51.

*† *Unio beaverensis* LEA, Pr. Ac. N. Sci. Phila., XII, 1868, p. 161; *Jl. Ac. N. Sci. Phila., VI, 1868, p. 297, pl. XLIV, fig. 109.—*Obs., XII, 1869, p. 57, pl. XLIV, fig. 109.—*B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *beaverenses* LEA, Syn., 1870, p. 52.

* *Unio bleaverenses* PÆTEL, Conch. Sam., III, 1890, p. 146.

* ? *Unio neglectus* SOWERBY, Conch. Icon., XVI, 1868, pl. LXV, fig. 329.

* *Unio tortuosus* SOWERBY, Conch. Icon., XVI, 1868, pl. LXV, fig. 330.—*PÆTEL, Conch. Sam., III, 1890, p. 169.

* *Unio uharcensis* LEA, Pr. Ac. N. Sci. Phila., XII, 1868, p. 145; *Jl. Ac. N. Sci. Phila., VI, 1868, p. 304, pl. XLVI, fig. 116; *Obs., XII, 1869, p. 63, pl. XLVI, fig. 116.—*B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *uharcensis* LEA, Syn., 1870, p. 52.

*† *Unio nubilus* LEA, Pr. Ac. N. Sci. Phila., XII, 1868, p. 161; *Jl. Ac. N. Sci. Phila., VI, 1868, p. 298, pl. XLIV, fig. 110; *Obs., XII, p. 58, pl. XLIV, fig. 110.—*B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *nubilus* LEA, Syn., 1870, p. 51.

*† *Unio yadkinensis* LEA, Pr. Ac. N. Sci. Phila., II, 1872, p. 156; *Jl. Ac. N. Sci. Phila., VIII, 1874, p. 32, pl. X, fig. 29; *Obs., XIII, 1874, p. 36, pl. X, fig. 29.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 155.

*† *Unio amplus* LEA, Pr. Ac. N. Sci. Phila., II, 1872, p. 157; *Jl. Ac. N. Sci. Phila., VIII, 1874, p. 39, pl. XIII, fig. 36; *Obs., XIII, 1874, p. 43, pl. XIII, fig. 36.—*B. H. WRIGHT, Check List, 1888.

*† *Unio ligatus* LEA, Pr. Ac. N. Sci. Phila., II, 1872, p. 157; *Jl. Ac. N. Sci. Phila., VIII, 1874, p. 49, pl. XVII, fig. 47; *Obs., XIII, 1874, p. 53, pl. XVII, fig. 47; *B. H. WRIGHT, Check List, 1888.

*† *Unio subparallelus* LEA, Pr. Ac. N. Sci. Phila., II, 1872, p. 158; *Jl. Ac. N. Sci. Phila., VIII, 1874, p. 46, pl. XVI, fig. 44; Obs., XIII, 1874, p. 50, pl. XVI, fig. 44.—*B. H. WRIGHT, Check List, 1888.

*† *Unio irwinensis* LEA, Pr. Ac. N. Sci. Phila., II, 1872, p. 159; *Jl. Ac. N. Sci. Phila., VIII, 1874, p. 44, pl. XV, fig. 42; *Obs., XIII, 1874, p. 48, pl. XV, fig. 42.—*B. H. WRIGHT, Check List, 1888.

*† *Unio curvatus* LEA, Pr. Ac. N. Sci. Phila., II, 1872, p. 159; *Jl. Ac. N. Sci. Phila., VIII, 1874, p. 38, pl. XIII, fig. 35; *Obs., XIII, 1874, p. 42, pl. XIII, fig. 35.

*† *Unio subsquamosus* LEA, Pr. Ac. N. Sci. Phila., II, 1872, p. 160; *Jl. Ac. N. Sci. Phila., VIII, 1874, p. 47, pl. XVI, fig. 45; *Obs., XIII, 1874, p. 51, pl. XVI, fig. 45.—*B. H. WRIGHT, Check List, 1888.

*† *Unio infuscus* LEA, Pr. Ac. N. Sci. Phila., II, 1872, p. 160; *Jl. Ac. N. Sci. Phila., VIII, 1874, p. 51, pl. XVII, fig. 49; *Obs., XIII, 1874, p. 55, pl. XVII, fig. 49.—*PÆTEL, Conch. Sam., III, 1890, p. 155.

*† *Unio ratus* LEA, Pr. Ac. N. Sci. Phila., II, 1872, p. 160; *Jl. Ac. N. Sci. Phila., VIII, 1874, p. 52, pl. XVIII, fig. 51; *Obs., XIII, 1874, p. 56, pl. XVIII, fig. 51; *B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 165.

*† *Unio basalis* LEA, Pr. Ac. N. Sci. Phila., II, 1872, p. 161; *Jl. Ac. N. Sci. Phila., VIII, 1874, p. 48, pl. XVI, fig. 46; *Obs., XIII, 1874, p. 52, pl. XVI, fig. 46.—*B. H. WRIGHT, Check List, 1888.

*† *Unio subolivaceus* LEA, Pr. Ac. N. Sci. Phila., III, 1873, p. 422; *Jl. Ac. N. Sci. Phila., VIII, 1874, p. 57, pl. XX, fig. 56; *Obs., XIII, 1874, p. 61, pl. XX, fig. 56.—*B. H. WRIGHT, Check List, 1888.

*† *Unio infulgens* LEA, Pr. Ac. N. Sci. Phila., III, 1873, p. 422; *Jl. Ac. N. Sci. Phila., VIII, 1874, p. 60, pl. XXI, fig. 59; *Obs., XIII, 1874, p. 64, pl. XXI, fig. 59.—*B. H. WRIGHT. Check List, 1888.

*† *Unio cirratus* LEA, Pr. Ac. N. Sci. Phila., III, 1873, p. 422; * Jl. Ac. N. Sci. Phila., VIII, 1874, p. 55, pl. XIX, fig. 53; *Obs., XIII, 1874, p. 59, pl. XIX, fig. 53.—*B. H. WRIGHT, Check List, 1888.

*† *Unio corneus* LEA, Pr. Ac. N. Sci. Phila., III, 1873, p. 423; * Jl. Ac. N. Sci. Phila., VIII, 1874, p. 59, pl. XX, fig. 58; *Obs., XIII, 1874, p. 63, pl. XX, fig. 58.—* B. H. WRIGHT, Check List, 1888.

*† *Unio incenustus* LEA, Pr. Ac. N. Sci. Phila., III, 1873, p. 424; * Jl. Ac. N. Sci. Phila., VIII, 1874, p. 66, pl. XXII, fig. 62; * Obs., XIII, 1874, p. 70, pl. XXII, fig. 62.—* B. H. WRIGHT, Check List, 1888.

*† *Arconaia provancheriana* PILSBRY, Nat. Canadienne, XX, 1890, p. 171; * Pr. Ac. N. Sci. Phila., 1892, p. 132, pl. VII, figs. 4–6.[1]

† UNIO COMPLANATUS var. JEJUNUS Lea.

* *Unio jejunus* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 9, pl. IV, fig. 9; * Obs., II, 1838, p. 9, pl. IV, fig. 9.—* TROSCHEL, Arch. für Nat., V, 1839, Pt. 2, p. 234.—* HANLEY, Test. Moll., 1842, p. 199; * Biv. Shells, 1843, p. 199, pl. XXII, fig. 47.—* CATLOW and REEVE, Conch. Nom., 1845, p. 60.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 251.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* KUSTER, Conch. Cab. Unio, 1862, p. 265, pl. XC, fig. 1.—* ? SOWERBY, Conch. Icon., XVI, 1868, pl. LXVIII, fig. 347.[2]—* B. H. WRIGHT, Check List, 1888.—PÆTEL, Conch. Sam., III, 1890, p. 155.

* *Margarita* (*Unio*) *jejunus* LEA, Syn., 1836, p. 30; 1838, p. 22.

* *Margaron* (*Unio*) *jejunus* LEA, Syn., 1852, p. 32; 1870, p. 51.

*† *Unio percoarctatus* LEA, Pr. Ac. N. Sci. Phila., I, 1857, p. 85; * Jl. Ac. N. Sci. Phila., V, 1862, p. 59, pl. III, fig. 206; * Obs., VIII, 1862, p. 63, pl. III, fig. 206.—* SOWERBY, Conch. Icon., XVI, 1866, pl. LIV, fig. 277.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 163.

* *Margaron* (*Unio*) *percoarctatus* LEA, Syn., 1870, p. 51.

† UNIO COMPLANATUS var. QUADRILATERUS Lea.

* *Unio squalidus* LEA, in part, Pr. Ac. N. Sci. Phila., VII, 1863, p. 192; Jl. Ac. N. Sci. Phila., VI, 1866, p. 22, pl. VII, fig. 20; Obs., XI, 1867, p. 26, pl. VII, fig. 20.—* B. H. WRIGHT, Check List, 1888.—* SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 429, pl. LXXI, fig. 14.

* *Margaron* (*Unio*) *squalidus* LEA, Syn., 1870, p 51.

*† *Unio quadrilaterus* LEA, Pr. Ac. N. Sci. Phila., VII, 1863, p. 192; Jl. Ac. N. Sci. Phila., VI, 1866, p. 5, pl. I, fig. 1; Obs., XI, 1867, p. 9, pl. I, fig. 1.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *quadrilaterus* LEA, Syn., 1870, p. 51.

Atlantic drainage from the St. Lawrence to Georgia; west in the British possessions to Manitoba?

† UNIO CATAWBENSIS Lea.

* *Unio wheatleyi* LEA, Pr. Ac. N. Sci. Phila., 1857, I, p. 85;[3] * Jl. Ac. N. Sci. Phila., V, 1861, p. 54, pl. I, fig. 200; Obs., VIII, p. 58, pl. I, fig. 200.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 147.

* *Margaron* (*Unio*) *catawbensis* LEA, Syn., 1870, p. 52.

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[1] Said to come from Yamaska River, China. The type is a twisted *Unio complanatus*, probably from Canada.

[2] In errata he says this is *depressus* of d'Orbigny, not Lamarck. It is hard to say what it is.

[3] Preoccupied by Lea and changed by him to *catawbensis*.

* *Unio rostrum* LEA, Pr. Ac. N. Sci. Phila., VIII, 1861, p. 391; *Jl. Ac. N. Sci. Phila., V, 1862, p. 201, pl. XXIX, fig. 270; Obs., IX, 1863, p. 23, pl. XXIX, fig. 270.—*B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *rostrum* LEA, Syn., 1870, p. 52.

*† *Unio oblongus* LEA, Pr. Ac. N. Sci. Phila., II, 1872, p. 158; *Jl. Ac. N. Sci. Phila., VIII, 1874, p. 52, pl. XVIII, fig. 50; Obs., XIII, 1874, p. 56, pl. XVIII, fig. 50.

North Carolina.

†UNIO TUOMEYI Lea.

* *Unio tuomeyi* LEA, Tr. Am. Phil. Soc., X, 1852, p. 256, pl. XIII, fig. 4; *Obs., V, 1852, p. 12, pl. XIII, fig. 4.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 170.

* *Margaron* (*Unio*) *tuomeyi* LEA, Syn., 1852, p. 33; 1870, p. 53.

*† *Unio barrattii* LEA, Tr. Am. Phil. Soc., X, 1852, p. 256, pl. XIII, fig. 5; *Obs., V, 1852, p. 12, pl. XIII, fig. 5.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 245.—*H. and A. Adams, Gen. Rec. Moll., II, 1857, p. 491.—*B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *barrattii* LEA, Syn., 1852, p. 37; 1870, p. 245.

* *Unio barrotti* PÆTEL, Conch. Sam., III, 1890, p. 145.

*† *Unio pullatus* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 262; *Jl. Ac. N. Sci. Phila., IV, 1858, p. 57, pl. VIII, fig. 39; *Obs., VI, 1858, p. 57, pl. VIII, fig. 39.—*KUSTER, Conch. Cab. Unio, 1871, p. 247, pl. LXXXIII, fig. 3.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXVI, fig. 335.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch Sam., III, 1890, p. 164.

* *Margaron* (*Unio*) *pullatus* LEA, Syn., 1870, p. 60.

*† *Unio sublatus* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 169; *Jl. Ac. N. Sci. Phila., IV, 1858, p. 82, pl. XVI, fig. 62; *Obs., VI, 1858, p. 82, pl. XVI, fig. 62.—*B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *sublatus* LEA, Syn., 1870, p. 57.

*† *Unio fumatus* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 171; *Jl. Ac. N. Sci. Phila., IV, 1858, p. 88, pl. XVIII, fig. 68; *Obs., VI, 1858, p. 88, pl. XVIII, fig. 68.—*B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *fumatus* LEA, Syn., 1870, p. 52.

*† *Unio viridiradiatus* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 154; *Jl. Ac. N. Sci. Phila., IV, 1860, p. 336, pl. LIII, fig. 161; *Obs., VIII, p. 18, pl. LIII, fig. 161.—*B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *viridiradiatus* LEA, Syn., 1870, p. 46.

*† *Unio viridans* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 170; *Jl. Ac. N. Sci. Phila., IV, 1860, p. 337, pl. LIV, fig. 162; *Obs., VIII, 1860, p. 19, pl. LIV, fig. 162.—*B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *viridans* LEA, Syn., 1870, p. 52.

*† *Unio hallenbeckii* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 170; *Jl. Ac. N. Sci. Phila., IV, 1860, p. 328, pl. LI, fig. 154;[1] *Obs., VIII, 1860, p. 10, pl. LI, fig. 154.—*B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *hallenbeckii* LEA, Syn., 1870, p. 52.

*† *Unio salebrosus* LEA, Pr. Ac. N. Sci. Phila., XI, 1859, p. 170; *Jl. Ac. N. Sci. Phila., IV, 1860, p. 332, pl. LII, fig. 157; *Obs., VIII, 1860, p. 14, pl. LII, fig. 157.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 166.

* *Margaron* (*Unio*) *salebrosus* LEA, Syn., 1870, p. 52.

*† *Unio verutus* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 171; *Jl. Ac. N. Sci.

[1] Extra copies of the paper containing this species were published in December, 1858.

Phila., IV, 1860, pl. LIII, fig. 160; *Obs., VIII, 1860, p. 17, pl. LIII, fig. 160.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 171.

**Margaron (Unio) verutus* LEA, Syn., 1870, p. 57.

*†*Unio chathamensis* LEA, Pr. Ac. N. Sci. Phila., VII, 1863, p. 191; *Jl. Ac. N. Sci. Phila., VI, 1866, p. 21, pl. VI, fig. 19; *Obs., XI, 1867, p. 25, pl. VI, fig. 19.—*B. H. WRIGHT, Check List, 1888.

Margaron (Unio) chathamensis LEA, Syn., 1870, p. 53.

*†*Unio hastatus* LEA, Pr. Ac. N. Sci. Phila., III, 1873, p. 423; *Jl. Ac. N. Sci. Phila., VIII, 1874, p. 56, pl. XIX, fig. 54; *Obs., XIII, 1874, p. 60, pl. XIX, fig. 54.—*B. H. WRIGHT, Check List, 1888.

*†*Unio dooleyensis* LEA, Pr. Ac. N. Sci. Phila., III, 1873, p. 424; *Jl. Ac. N. Sci. Phila., VIII, 1874, p. 64, pl. XXII, fig. 60; *Obs., XIII, 1874, p. 68, pl. XXII, fig. 60.—*B. H. WRIGHT, Check List, 1888.

*†*Unio gesnerii* LEA, Pr. Ac. N. Sci. Phila., III, 1874, p. 424; *Jl. Ac. N. Sci. Phila., VIII, 1874, p. 65, pl. XXII, fig. 64; *Obs., XIII, 1874, p. 69, pl. XXII, fig. 61.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXIV, fig. 446.—*B. H. WRIGHT, Check List, 1888.

North Carolina to Alabama.

†UNIO OCMULGEENSIS Lea.

**Unio ocmulgeensis* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 38; *Jl. Ac. N. Sci. Phila., V, 1862, p. 95, pl. XIV, fig. 243; *Obs., VIII, 1862, p. 99, pl. XIV, fig. 243.—*SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 424, pl. LXVII, fig. 5.—*B. H. WRIGHT, Check List, 1888.

**Margaron (Unio) ocmulgeensis* LEA, Syn., 1870, p. 57.

Georgia.

†UNIO AQUILUS Lea.

**Unio aquilus* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 172; *Jl. Ac. N. Sci. Phila., IV, 1858, p. 92, pl. XX, fig. 72; *Obs., VI, 1858, p. 92, pl. XX, fig. 72.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 144.

**Margaron (Unio) aquilus* LEA, Syn., 1870, p. 60.

South Georgia and northern Florida.

†UNIO ICTERINUS Conrad.

**Unio icterinus* CONRAD, New F. W. Shells, 1834, pl. VI, fig. 5, p. 69.—*FERUSSAC, Guer. Mag., 1835, p. 29.—*CONRAD, Monog., IV, 1836, p. 39, pl. XVIII, fig. 2.—*MÖLLER, Syn. Nov. Gen., 1836, p. 206.—*CHENU, Bib. Conch., 1st ser., III, 1845, p. 20, pl. 1, fig. 5.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 250.—*B. H. WRIGHT, Check List, 1888.

*†*Unio fuliginosus* LEA, Pr. Am. Phil. Soc., IV, 1845, p. 164; *Tr. Am. Phil. Soc., X, 1848, p. 78, pl. VII, fig. 19; *Obs., IV., 1848, p. 52, pl. VII, fig. 19.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 250.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 153.

**Margaron (Unio) fuliginosus* LEA, Syn., 1852, p. 33; 1870, p. 53.

*†*Unio curierianus* LEA, Tr. Am. Phil. Soc., IX, 1852, p. 263, pl. XVI, fig. 16; Obs., V, 1852, p. 19, pl. XVI, fig. 16.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 248.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 150.

**Margaron (Unio) curierianus* LEA, Syn., 1852, p. 32; 1870, p. 51.

*†*Unio curatus* LEA, Pr. Ac. N. Sci. Phila., VII, 1863, p. 193; *Jl. Ac. N. Sci. Phila.,

VI, 1866, p. 23, pl. VII, fig. 21; Obs., XI, 1867, p. 27, pl. VII, fig. 21.—*P. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p.149.

*Margaron (Unio) curatus LEA, Syn., 1870, p. 46.

*† *Unio datus* LEA, Pr. Ac. N. Sci. Phila., XII, 1868, p. 161; * Jl. Ac. N. Sci. Phila., VI, 1868, p. 299, pl. XLIV, fig. 3; * Obs., XII, 1869, p. 59, pl. XLIV, fig. 3.—* B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 150.

*Margaron (Unio) datus LEA, Syn., 1870, p. 45.

* *Unio ratus* PÆTEL, Conch. Sam., III, 1890, p. 172.

*† *Unio cuspidatus*, LEA, Pr. Ac. N. Sci. Phila., II, 1872, p. 159; *Jl. Ac. N. Sci. Phila., VIII, 1874, p. 43, pl. XIV, fig. 50; *Obs., XIII, 1874, p. 47, pl. XIV, fig. 40.—* B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 150.

North Carolina to Georgia.

†UNIO ROANOKENSIS Lea.

* *Margarita (Unio) roanokensis* LEA, Syn., 1836, p. 30; 1838, p. 21.

* *Unio roanokensis* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 27, pl. VIII, fig. 21; Obs., II, 1838, p. 27, pl. VIII, fig. 21.—* TROSCHEL, Arch. für Nat., V, 1839, Pt. 2, p. 235.—* HANLEY, Test. Moll., 1842, p. 199; * Biv. Shells, 1843, p. 199.—* CATLOW and REEVE, Conch. Nom., 1845, p. 63.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 275.—* CHENU, Ill. Conch., 1858, pl. XX, figs. 6, 6*a*, 6*b*.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXVI, fig. 341.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam. III, 1890, p. 165.

* *Margaron (Unio)* LEA, Syn., 1852, p. 32; 1870, p. 51.

*† *Unio macer* LEA, Pr. Ac. N. Sci. Phila., I, 1857, p. 86; * Jl. Ac. N. Sci. Phila., VI, 1862, p. 202, pl. XXIX, fig. 271; * Obs., IX, 1863, p. 24, pl. XXIX, fig. 271.

* *Margaron (Unio) macer* LEA, Syn., 1870, p. 51.

*† *Unio latus* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 171; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 334, pl. LIII, fig. 159; * Obs., VIII, 1860, p. 16, pl. LIII, fig. 159.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 157.

* *Margaron (Unio) latus* LEA, Syn., 1870, p. 57.

†UNIO ROANOKENSIS var. NORTHAMPTONENSIS Lea.

* *Unio northamptonensis* LEA,[1] Pr. Ac. N. Sci. Phila., V, 1861, p. 392; *Jl. Ac. N. Sci. Phila., V., 1862, p. 190, pl. XXV, fig. 260; * Obs., IX, 1863, p. 12, pl. XXV, fig. 260.—* B. H. WRIGHT, Check List, 1888.

*Margaron (Unio) northamptonensis LEA, Syn., 1870, p. 51.

Connecticut River at Northampton, Massachusetts; south to the Savannah River, Georgia.

†UNIO HOPETONENSIS Lea.

* *Unio hopetonensis* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 29, pl. IX, fig. 24; * Obs., II, 1838, p. 29, pl. IX, fig. 24.—* TROSCHEL, Arch. für Nat., VI, 1839, Pt. 2. p. 235.—* HANLEY, Test. Moll., 1842, p. 198; * Biv. Shells, 1843, p. 198, pl. XX, fig. 21.—*CATLOW and REEVE, Conch. Nom., 1845, p. 60.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* CHENU, Ill. Conch., 1858, pl. XX, figs. 5, 5*a*, 5*b*.—* KUSTER, Conch. Cab. Unio, 1861, p. 196, pl. LXIII, fig. 1.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXVIII, fig. 349.—* B. H. WRIGHT, Check List,

[1] A large, compressed form, biangulate behind, the posterior point elevated above the base line. Certain specimens are considerably inflated in the post basal region. This is generally taken for *U. complanatus*, but it differs in the characters given above, and seems to be merely a northern variety of *roanokensis*.

1888.—* P.ETEL, Conch. Sam., III, 1890, p. 155.—* SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 412, pl. LII, fig. 3; LIII, fig. 1.

**Margarita* (*Unio*) *hopetonensis* LEA, Syn., 1836, p. 30; 1838, p. 21.

**Margaron* (*Unio*) *hopetonensis* LEA, Syn., 1852, p. 32; 1870, p. 51.

Georgia, in streams flowing into the Atlantic; Santee Canal, South Carolina; northern Florida.

† UNIO LIVINGSTONENSIS Lea.

**Unio livingstonensis* LEA, Pr. Ac. N. Sci. Phila., VII, p. 192; * Jl. Ac. N. Sci. Phila., VI, 1866, p. 14, pl. IV, fig. 11; * Obs., XI, 1867, p. 18, pl. IV, fig. 11.—* B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *livingstonensis* LEA, Syn., 1870, p. 52.

North Carolina to Georgia.

† UNIO INUSITATIS Lea.

**Unio inusitatis* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 171; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 333, pl. LII, fig. 158; * Obs., VIII, 1860, p. 15, pl. LII, fig. 158.

**Margaron* (*Unio*) *inusitatus* LEA, Syn., 1870, p. 51.

**Unio insitatus* B. H. WRIGHT, Check List, 1888.

Georgia.

† UNIO DIFFERTUS Lea.

**Unio differtus* LEA, Pr. Ac. N. Sci. Phila., II, 1872, p. 158; * Jl. Ac. N. Sci. Phila., VIII, 1874, p. 42, pl. XIV, fig. 39; * Obs., XIII, 1874, p. 46, pl. XIV, fig. 39.—* B. H. WRIGHT, Check List, 1888.

Georgia.

† UNIO PLANTII Lea.

**Unio plantii* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 171; * Jl. Ac. N. Sci. Phila., IV, 1859, p. 192, pl. XXI, fig. 76; * Obs., VII, 1859, p. 10, pl. XXI, fig. 76.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXVII, fig. 473.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., 1888.

**Margaron* (*Unio*) *plantii* LEA, Syn., 1870, p. 43.

Flint River, near Macon, Georgia.

† UNIO STRUMOSUS Lea.

**Unio strumosus* LEA, Pr. Ac. N. Sci. Phila., II, 1872, p. 158; III, 1873, p. 423; * Jl. Ac. N. Sci. Phila., VIII, 1874, p. 57, pl. XIX, fig. 55; * Obs., XIII, 1874, p. 61, pl. XIX, fig. 55.—* B. H. WRIGHT, Check List, 1888.

Yadkin River, North Carolina.

† UNIO PURUS Lea.

**Unio purus* LEA, Pr. Ac. N. Sci. Phila., II, 1858, p. 41; * Jl. Ac. N. Sci Phila., V, 1862, p. 61, pl. IV, fig. 209; * Obs., VIII, 1862, p. 65, pl. IV, fig. 209.—* B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *purus* LEA, Syn., 1870, p. 43.

Neuse River, near Raleigh, North Carolina.

†UNIO SUBNIGER Lea.

**Unio subniger* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 172; *Jl. Ac. N. Sci. Phila., IV, 1859, p. 196, pl. XXII, fig. 79; *Obs., VII, 1859, p. 14, pl. XXII, fig. 79.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *subniger* LEA, Syn., 1870, p. 52.

Georgia.

†UNIO BURKENSIS Lea.

**Unio burkensis* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 112; *Jl. Ac. N. Sci. Phila., IV, 1859, p. 215, pl. XXVII, fig. 95; *Obs., VII, 1859, p. 33, pl. XXVII, fig. 99.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *burkensis* LEA, Syn., 1870, p. 60.

* † *Unio dissimilis* LEA, Pr. Ac. N. Sci. Phila., II, 1872, p. 161; *Jl. Ac. N. Sci. Phila., VIII, 1874, p. 53, pl. XVIII, fig. 52; *Obs., XIII, 1874, p. 57, pl. XVIII fig. 52.—*B. H. WRIGHT, Check List, 1888.

North Carolina; south to Georgia.

†UNIO OBLATUS Lea.

**Unio ablatus* LEA,[1] Pr. Ac. N. Sci. Phila., VII, 1863, p. 193.

**Unio oblatus* LEA, Jl. Ac. N. Sci. Phila., VI, 1866, p. 13, pl. IV, fig. 10; *Obs. XI, 1867, p. 17, pl. IV, fig. 10.

**Margaron* (*Unio*) *oblatus* LEA, Syn., 1870, p. 60.

Long Creek, Gaston County, North Carolina.

†UNIO ERRANS Lea.

†*Unio paliatus* RAVENEL, letter.[2]—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 254.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.

**Margarita* (*Unio*) *paliatus* LEA, Syn., 1836, p. 31; 1838, p. 22.

**Margaron* (*Unio*) *paliatus* LEA, Syn., 1852, p. 33; 1870, p. 53.

**Unio palliatus* RAVENEL, Cat., 1875, p. 57.[3]—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 162.

**Unio errans* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 262; *Jl. Ac. N. Sci. Phila., IV, 1858, p. 60, pl. IX, fig. 42; *Obs., VI, 1858, p. 60, pl. IX, fig. 42.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *errans* LEA, Syn., 1870, p. 52.

*†*Unio vicinus* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 262; *Jl. Ac. N. Sci. Phila., IV, 1858, p. 61, pl. IX, fig. 43; *Obs., VI, 1858, p. 61, pl. IX, fig. 43.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *vicinus* LEA, Syn., 1870, p. 52.

Near Macon, Georgia; South Carolina.

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[1] So written in first description. A typographical error, probably. Dr. Lea afterwards changed the name to *oblatus*.

[2] Dr. Lea credits this to Ravenel's letter, but neither he nor Ravenel ever described it so far as I know.

[3] Ravenel here credits this species to Lea. Lea's specimens, received from Ravenel, are marked Santee Canal and South Carolina. They are rather thin and delicate, of a peculiar texture, and have a shining brownish green epidermis.

† UNIO SAGITTIFORMIS Lea.[1]

* *Unio sagittiformis* LEA, Tr. Am. Phil. Soc., X, 1852, p. 277, pl. XXII, fig. 35; * Obs., V, 1852, p. 33, pl. XXII, fig. 35.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 257.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—* SOWERBY, Conch. Icon., XVI, 1868, pl. XCII, fig. 499.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 166.

* *Margaron* (*Unio*) *sagittiformis* LEA, Syn., 1852, p. 37; 1870, p. 60.

Oconee River, Georgia; Abbeville, South Carolina.

† UNIO ANGUSTATUS Lea.

* *Unio angustatus* LEA, Tr. Am. Phil. Soc., IV, 1831, p. 114, pl. XVII, fig. 43; * Obs., I, 1834, p. 124, pl. XVII, fig. 43.—* CONRAD, New F. W. Shells, 1834, p. 67.—* FERUSSAC, Guer. Mag., 1835, p. 26.—* CONRAD, Monog., XI, 1838, p. 98, pl. LIV, fig. 2.—* HANLEY, Test. Moll., 1842, p. 204; * Biv. Shells, 1843, p. 204, pl. XXII, fig. 25.—* CATLOW and REEVE, Conch. Nom., 1845, p. 55.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 245.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—* CHENU, Ill. Conch. 1858, pl. XIV, figs. 1, 1*a*, 1*b*.—* KUSTER, Conch. Cab. Unio, 1861, p. 178, pl. LVI, fig. 4.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXII, fig. 372.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 144.

* *Margarita* (*Unio*) *angustatus* LEA, Syn., 1836, p. 35; 1838, p. 23.

* *Margaron* (*Unio*) *angustatus* LEA, Syn., 1852, p. 36; 1870, p. 57.

* † *Unio extensus* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 31; * Jl. Ac. N. Sci. Phila., IV, 1858, p. 68, pl. XII, fig. 49; * Obs., VI, 1868, p. 67, pl. XII, fig. 49.—* B. H. WRIGHT, Check List, 1888.

* *Margaron extensus* LEA, Syn., 1870, p. 60.

* † *Unio subcylindraceus* LEA, Pr. Ac. N. Sci. Phila., III, 1873, p. 422; * Jl. Ac. N. Sci. Phila., VIII, 1874, p. 58, pl. XX, fig. 57; * Obs., XIII, 1874, p. 62, pl. XX, fig. 57.—* CATLOW and REEVE, Conch. Nom., 1845, p. 64.—* B. H. WRIGHT, Check List, 1888.

South Carolina to western Georgia.

† UNIO PERSTRIATUS Lea.

* *Unio perstriatus* LEA, Tr. Am. Phil. Soc., X, 1852, p. 255, pl. XII, fig. 3; * Obs., V, 1852, p. 11, pl. XII, fig. 3.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 255.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—* SOWERBY, Conch. Icon., XVI, 1868, pl. XCII, fig. 500.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 163.

* *Margaron* (*Unio*) *perstriatus* LEA, Syn., 1852, p. 36; 1870, p. 57.

* † *Unio gracilentus* LEA, Pr. Ac. N. Sci. Phila., I, 1857, p. 85; * Jl. Ac. N. Sci. Phila., V, 1862, p. 58, pl. III, fig. 205; * Obs., VIII, 1862, p. 62, pl. III, fig. 205.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *gracilentus* LEA, Syn., 1870, p. 60.

* † *Unio perlatus* LEA, Pr. Ac. N. Sci. Phila., VII, 1863, p. 193; * Jl. Ac. N. Sci., VI, 1866, p. 15, pl. IV, fig. 13; * Obs., XI, 1867, p. 19, pl. IV, fig. 12.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *perlatus* LEA, Syn., 1870, p. 60.

North and South Carolina.

[1] A very singular shell, much cut away at the anterior base, and, perhaps, abnormal.

†UNIO NAVICULOIDES Lea.

**Unio naviculoides* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 170; *Jl. Ac. N. Sci. Phila., IV, 1858, p. 94, pl. XX, fig. 74; * Obs., VI, 1858, p. 94, pl. XX, fig. 74.—B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *naviculoides* LEA, Syn., 1870, p. 60.

Georgia.

†UNIO SORDIDUS Lea.

**Unio sordidus* LEA, Tr. Am. Phil. Soc., X, 1852, p. 254, pl. XII, fig. 1; * Obs., V, 1852, p. 10, pl. XII, fig. 1.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 1853, p. 257.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 168.

**Margaron* (*Unio*) *sordidus* LEA, Syn., 1852, p. 33; 1870, p. 54.

*†*Unio gibbesianus* LEA, Tr. Am. Phil. Soc., X, 1852, p. 254, pl. XII, fig. 2; * Obs., V, 1852, p. 10, pl. XII, fig. 2.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 250.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *gibbesianus* LEA, Syn., 1852, p. 33; 1870, p. 54.

Abbeville, South Carolina.

†UNIO SPADICEUS Lea.

**Unio spadiceus* LEA, Pr. Ac. N. Sci. Phila., I, 1857, p. 86; *Jl. Ac. N. Sci. Phila., V, 1862, p. 55, pl. I, fig. 202; * Obs., VIII, 1862, pl. I, fig. 201.—* B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *spadiceus* LEA, Syn., 1870, p. 48.

North Carolina.

†UNIO STRIGOSUS Lea.

**Unio strigosus* LEA, Pr. Am. Phil. Soc., I, 1840, p. 287; * Tr. Am. Phil. Soc., VIII, 1843, p. 198, pl. IX, fig. 9; * Obs., III, 1842, p. 36 pl. IX, fig. 9.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 258.—* H. and A ADAMS, Gen. Rec. Moll., II., 1857.—* CHENU, Ill. Conch., 1858, pl. XXX, figs. 6, 6*a*, 6*b*.—* B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *strigosus* LEA, Syn., 1852, p. 36; 1870, p. 57.

Southwest Georgia; southeast Alabama.

†UNIO LAZARUS Lea.[1]

**Unio lazarus* LEA, Pr. Am. Phil. Soc., V, 1852, p. 251; * Tr. Am. Phil. Soc., XI, 1852, p. 259, pl. XIV, fig. 9; * Obs., V, 1852, p. 15, pl. XIV, fig. 9.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 251.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—* B. H. WRIGHT, Check List, 1888.—PÆTEL, Conch. Sam., III, 1890, p. 157.

**Margaron* (*Unio*) *lazarus* LEA, Syn., 1852, p. 39; 1870, p. 62.

Abbeville district, South Carolina.

(Group of *Unio donaciei*.)

Shell subtrapezoidal, inflated, solid, truncate and more or less triangular behind, sometimes swollen in the postbasal region, with a well-

[1] A peculiarly compressed, arcuate form. Some specimens of *U. arctatus* approach it closely.

developed posterior ridge; beaks full, their sculpture not observed; epidermis smooth and shining in the young shell, becoming duller and roughened when old; hinge moderately strong; pseudocardinals radial, roughened; laterals heavy, somewhat remote, curved; there is a more or less developed secondary lateral in the right valve; dorsal scars few, in a row just behind the pseudocardinals and fully exhibited on the inner edge of the shallow beak cavity; nacre dull; muscle scars distinct, smooth.

Animal with the marsupium occupying the whole of the outer gills; inner gills free from the abdominal sac a part of their length; palpi rather small; mantle line thick on the border.

†UNIO DOWNIEI Lea.

* *Unio downiei* LEA, Pr. Ac. Nat. Sci. Phila., II, 1858, p. 166; Jl. Ac. Nat. Sci. Phila., IV, 1859, p. 210, pl. XXV, fig. 91; Obs., VII, 1859, p. 28, pl. XXV, fig. 91.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXVIII, fig. 350.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p.151.—* SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 413, pl. LV, figs. 1–3; LVI, fig. 5.

* *Margaron* (*Unio*) *downiei* LEA, Syn., 1870, p. 41.

Southern Georgia; north Florida.

†UNIO GEMINUS Lea.

* *Unio geminus* LEA, Pr. Ac. Nat. Sci. Phila., VIII, 1856, p. 262; * Jl. Ac. Nat. Sci. Phila., 1858, p. 63, pl. X, fig. 45; * Obs., VI, 1858, p. 63, pl. X, fig. 45.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *geminus* LEA, Syn., 1870, p. 41.

* † *Unio satillaensis* LEA, Pr. Ac. Nat. Sci. Phila., II, 1858, p. 166; * Jl. Ac. Nat. Sci. Phila., IV, 1859, p. 216, pl. XXVII, fig. 96; Obs., VII, 1859, p. 34, pl. XXVII, fig. 96.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *satillaensis* LEA, Syn., 1870, p. 41.

Georgia.

†UNIO LECONTIANUS Lea.

* *Margarita* (*Unio*) *lecontianus* LEA, Syn., 1836, p. 23; 1838, p. 18.

* *Unio lecontianus* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 40, pl. XII, fig. 35; * Obs., II, 1838, fig. 40, pl. XII, fig. 35.—* TROSCHEL, Arch. fiir Naturg., V, 1839, Pt. 2, p. 236.—* HANLEY, Test. Moll., 1842, p. 188; * Biv. Shells, 1843, p. 188, pl. XXII, figs. 11, 51.—* CATLOW and REEVE, Conch. Nom., 1845, p. 60.—* CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 251.—* CHENU, Ill. Conch., 1858, pl. XXIV, figs. 6, 6*a*, 6*b*.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXIII, fig. 173.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 157.

* *Margaron* (*Unio*) *lecontianus* LEA, Syn., 1852, p. 26; 1870, p. 41.

* *Unio contrarius* CONRAD, Pr. Ac. Nat. Sci. Phila., IV, 1849, p. 153; * Ann. and Mag., IV, 1849, p. 301; * Jl. Ac. Nat. Sci. Phila., 1850, p. 276, pl. XXXVII, fig. 7; * Pr. Ac. N. Sci. Phila., VI, 1853, p. 247.

Georgia.

†UNIO SPISSUS Lea.

**Unio spissus* LEA, Pr. Ac. Nat. Sci. Phila., III, 1859, p. 112; *Jl. Ac. Nat. Sci. Phila., IV, 1859, p. 208, pl. XXV, fig. 89; *Obs., VII, 1859, p. 26, pl. XXV, fig. 89.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXVIII, fig. 476.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890. p. 168.

**Margaron* (*Unio*) *spissus* LEA, Syn., 1870, p. 41.

Georgia.

(Group of *Unio fisherianus*.)

Shell elongated, rather thin, subcompressed, pointed behind and sometimes slightly biangulate; posterior ridge generally well developed; beaks low, the sculpture consisting of a few coarse, slightly irregular ridges which run nearly parallel with the growth lines, generally heavier where they cross the posterior ridge; epidermis sometimes rayed, shining; pseudocardinals usually compressed; laterals long, straight, and lamellar; beak cavities very shallow and containing two or three dorsal scars at some distance behind the beaks; muscle scars well marked, the posterior ones elongated; nacre generally dull. Animal with the gills greatly elongated, inner the larger, more or less free from the abdominal sac; marsupium occupying nearly or quite the whole length of the outer branchiæ; palpi elongated; mantle thin, thicker on the edge.

†UNIO LANCEOLATUS Lea.

**Unio lanceolatus* LEA, Tr. Am. Phil. Soc., 1828, p. 266, pl. III, fig. 2; *Obs., I, 1834, p. 8, pl. III, fig. 2.—*CONRAD, New F. W. Shells, 1834, p. 70.—*FERUSSAC, Guer. Mag., 1835, p. 26.—*CONRAD, Monog. III, 1836, p. 32, pl. XIV., fig. 2.—*HANLEY, Test. Moll., 1842, p. 204; *Biv. Shells., 1843, p. 204, pl. XX, fig. 60; XXII, fig. 26.—*CATLOW and REEVE, Conch. Nom., 1845, p. 60.—*CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 251.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—*CHENU, Ill., Conch. 1858, pl. VIII, fig. 1, 1*a*, 1*b*.—*KUSTER, Conch. Cab. Unio., 1861, p. 204, pl. LXVIII, fig. 4.—*SOWERBY, Conch. Icon., XVI, 1866, pl. XLIII, fig. 236.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 156.

**Margarita* (*Unio*) *lanceolatus* LEA, Syn., 1836, p. 35; 1838, p. 24.

**Margaron* (*Unio*) *lanceolatus* LEA, Syn., 1852, p. 36; 1870, p. 57.

**Unio lanceolata* DESHAYES, Enc. Méth., II, 1830, p. 585; *An. sans Vert., 2d ed., VI, 1835, p. 547; 3d ed., II, 1839, p. 672.

North Carolina; Virginia.

†UNIO VIRIDULUS Lea.[1]

**Unio viridulus* LEA, Pr. Ac. Nat. Sci. Phila., VII, 1863, p. 193; *Jl. Ac. Nat. Sci. Phila., VI, 1866, p. 10, pl. III, fig. 17; *Obs., XI, 1867, p. 14, pl. III, fig. 17.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *viridulus* LEA, Syn., 1870, p. 58.

Neuse River, near Raleigh, North Carolina.

[1] A young shell, no doubt, which in texture and appearance is much like *U. lanceolatus*, but is bright green and not so pointed behind.

† UNIO PRODUCTUS Conrad.[1]

Unio productus CONRAD, Monog., III, 1836, p. 31, pl. XIV, fig. 1.—* HANLEY, Test. Moll., 1842, p. 205; * Biv. Shells, 1843, p. 205, pl. XXIII, fig. 17.—* CATLOW and REEVE, Conch. Nom., 1845, p. 63.—* KUSTER, Conch. Cab. Unio, 1852, p. 66, pl. XVI, fig. 2.—* CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 255.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch Sam., III, 1890, p. 164.

* *Margarita* (*Unio*) *productus* LEA, Syn., 1836, p. 37; 1838, p. 24.

* *Margaron* (*Unio*) *productus*, LEA, Syn., 1852, p. 37; 1870, p. 60.

* *Unio barrotti* KUSTER, Conch. Cab. Unio, 1861, p. 189, pl. LIX, fig. 6.

North Carolina; Virginia; Maryland.

† UNIO NASUTULUS Lea. (Emend.)

* *Unio nasutilus*[2] LEA, Pr. Ac. N. Sci. Phila., VII, 1863, p. 192.

* *Unio nasutulus* LEA, Jl. Ac. N. Sci. Phila., VI, 1866, p. 12, pl. III, fig. 9; * Obs., XI, 1867, p. 16, pl. III, fig. 9.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *nasutulus* LEA, Syn., 1870, p. 60.[3]

Livingston's Creek, Brunswick County, North Carolina.

† UNIO FISHERIANUS Lea.

* *Unio fisherianus* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 8, pl. IV, fig. 8; * Obs., II, 1838, p. 8, pl. IV, fig. 8.—* TROSCHEL, Arch. für Naturg., V, 1839, Pt. 2, p. 234.—* HANLEY, Test. Moll., 1842, p. 206; * Biv. Shells, 1843, p. 206, pl. XXII, fig. 52.—* CATLOW and REEVE, Conch. Nom., 1845, p. 59.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 249.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—* CHENU, Ill. Conch., 1858, pl. XX, figs. 4, 4*a*, 4*b*.—* KUSTER, Conch. Cab. Unio., 1861, p. 205, pl. LXVIII, fig. 6.—* REEVE, Conch. Icon., XVI, 1865, pl. XXIV, fig. 113.—* HARTMAN and MICHENER, Conch. Cest., 1874, p. 90, fig. 187.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 152.

* *Margarita* (*Unio*) *fisherianus* LEA, Syn., 1836, p. 37; 1838, p. 24.

* *Margaron* (*Unio*) *fisherianus* LEA, Syn., 1852, p. 37; 1870, p. 60.

* *Unio nasutus* CONRAD (part),[4] Monog., II, 1838, pl. XVIII, fig. 1.

Virginia; Maryland; Pennsylvania, in the Atlantic drainage.

† UNIO EMMONSII Lea.

* *Unio emmonsii* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 86; * Jl. Ac. N. Sci. Phila., V, 1862, p. 56, pl. II, fig. 203; * Obs., VIII, 1862, p. 60, pl. II, fig. 203.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *emmonsii* LEA, Syn., 1870, p. 60.

North Carolina.

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[1] I have seen a large number of specimens of what I suppose is this, none of which exactly agree with Conrad's figure and description, but which I can not refer to anything else.

[2] So written; no doubt a typographical error.

[3] Probably only a variety of *U. productus* Conrad.

[4] Conrad's first two figures (under fig. 1) are certainly *U. fisherianus*, the third is a female *nasutus*.

†UNIO DISPALANS B. H. Wright.

* *Unio dispalans* B. H. WRIGHT, Nautilus, 1899, p. 50.

† UNIO SUBINFLATUS Conrad.

* *Unio subinflatus* CONRAD, Monog., XI, 1838, p. 97, pl. LIV, fig. 1; * Pr. Ac. N. Sci. Phila., VI, 1853, p. 258.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 168.

* *Margaron (Unio) subinflatus* LEA, Syn., 1870, p. 52.

South Georgia; Florida.

†UNIO AHENEUS Lea.

* *Unio aheneus* LEA, Desc. 12 Uniones, 1843 (no paging); * Tr. Am. Phil. Soc., IX, 1846, p. 280, pl. XLI, fig. 9; * Obs., IV, 1848, p. 38, pl. XLI, fig. 9.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXVI, fig. 194.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 144.—* SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 431, pl. LXXII, fig. 6.

* *Margaron (Unio) aheneus* LEA, Syn., 1852, p. 37; 1870, p. 60.

Florida.

†UNIO WALTONI B. H. Wright.

* *Unio waltoni* B. H. WRIGHT, Pr. Ac. N. Sci. Phila., 1888, p. 114, pl. II, fig. 3; * Check List, 1888.—* SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 431, pl. LXXIII, fig. 7.

Florida.

†UNIO ATTENUATUS Lea.

* *Unio attenuatus* LEA, Pr. Ac. N. Sci. Phila., II, 1872, p. 157; * Jl. Ac. N. Sci. Phila., VIII, 1874, p. 41, pl. XIV, fig. 38; * Obs., XIII, 1874, p. 45, pl. XIV, fig. 38.—* B. H. WRIGHT, Check List, 1888.

Georgia.

†UNIO ROSTRÆFORMIS Lea.

* *Unio rostræformis* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 262.

* *Unio rostriformis* LEA, Jl. Ac. N. Sci. Phila., IV, 1858, p. 64, pl. X, fig. 46; * Obs., VI, 1858, p. 64, pl. X, fig. 46.—* B. H. WRIGHT, Check List, 1888.

* *Margaron (Unio) rostriformis* LEA, Syn., 1870, p. 60.

* †*Unio maconensis* LEA, Pr. Ac. N. Sci. Phila., VIII, 1857, p. 172; * Jl. Ac. N. Sci. Phila., IV, 1858, p. 93, pl. XX, fig. 73; Obs., VI, 1858, p. 93, pl. XX, fig. 73.—* B. H. WRIGHT, Check List, 1888.

* *Margaron (Unio) maconensis* LEA, Syn., 1870, p. 60.

Georgia.

UNIO DUTTONIANUS Lea.

* *Unio duttonianus* LEA, Pr. Ac. N. Sci. Phila., II, 1841, p. 31; * Jl. Ac. N. Sci. Phila., VIII, 1842, p. 236, pl. XXII, fig. 50; * Obs., III, 1842, p. 74, pl. XXII, fig. 50.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 248.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—* CHENU, Ill. Conch., 1858, pl. XXXII, figs. 4, 4*a*, 4*b*.—SOWERBY, Conch. Icon., XVI, 1868, pl. XCI, fig. 492.—* B. H. WRIGHT, Check List, 1888.

* *Margaron (Unio) duttonianus* LEA, Syn., 1852, p. 35; 1870, p. 57.

* *Unio duttonianus* PÆTEL, C. Sam., III, 1890, p. 151.

Ogeechee Canal, Savannah, Georgia.

†UNIO FOLLICULATUS Lea.

* *Unio folliculatus* LEA, Tr. Am. Phil. Soc., VI, 1858, p. 38, pl. XI, fig. 33; * Obs., II, 1838, p. 38, pl. XI, fig. 33.—* TROSCHEL, Arch. für Nat., V, 1839, Pt. 2, p. 236.—* HANLEY, Test. Moll., 1842, p. 204; * Biv. Shells, 1843, p. 204, pl. XXII, fig. 55.—* CATLOW and REEVE, Conch. Nom., 1845, p. 59.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 249.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—* CHENU, Ill. Conch., 1858, pl. XXIII, figs. 4, 4*a*, 4*b*.—* KUSTER, Conch. Cab. Unio, 1861, p. 202, pl. LXVII, fig. 4.—* SOWERBY, Conch. Icon., XVI, 1868, pl. XCI, fig. 493.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 153.

* *Margarita* (*Unio*) *folliculatus* LEA, Syn., 1836, p. 34; 1838, p. 23.

* *Margaron* (*Unio*) *folliculatus* LEA, Syn., 1852, p. 35; 1870, p. 57.

* †*Unio exacutus* LEA, Pr. Ac. N. Sci. Phila., II, 1872, p. 159; * Jl. Ac. N. Sci. Phila., VIII, 1874, p. 45, pl. XV, fig. 43; * Obs., XIII, 1874, p. 49, pl. XV, fig. 49.—* B. H. WRIGHT, Check List, 1888.

* †*Unio rostellum* LEA, Pr. Ac. N. Sci. Phila., II, 1872, p. 160; * Jl. Ac. N. Sci. Phila., VIII, 1874, p. 44, pl. XV, fig. 41; * Obs., XIII, 1874, p. 48, pl. XV, fig. 41.—* B. H. WRIGHT, Check List, 1888.

Georgia.

†UNIO SHEPARDIANUS Lea.

* *Unio shepardianus* LEA, Tr. Am. Phil. Soc., V, 1834, p. 95, pl. XIII, fig. 38; * Obs., I, 1834, p. 207, pl. XIII, fig. 38.—* CONRAD, Monog., VIII, 1837, p. 70, pl. XXXIX.—* FERUSSAC, Guer. Mag., 1835, p. 29.—* HANLEY, Test. Moll., 1842, p. 203; * Biv. Shells, 1843, p. 203, pl. XXIII, fig. 25.—* KUSTER, Conch. Cab. Unio, 1852, p. 65, pl. XVI, fig. 1.—* CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 257.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—* †CHENU, Man., 1859, II, p. 139, fig. 647.—* REEVE, Conch. Icon., XVI, 1865, pl. XIX, fig. 90.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 167.

* *Margarita* (*Unio*) *shepardianus* LEA, Syn., 1836, p. 34; 1838, p. 23.

* *Margaron* (*Unio*) *shepardianus* LEA, Syn., 1852, p. 35; 1870, p. 57.

* *Unio sheppardianus* CATLOW and REEVE, Conch. Nom., 1845, p. 64.

Altamaha River, Georgia.

(Group of *Unio popeii*.)

Shell elongated, narrowed in front, and biangulate behind, with the base slightly sinuate, feebly sulcate; beaks not prominent, sculptured with rather fine, somewhat broken, often faint ridges, which have a tendency to fall into two rounded loops; pseudocardinals compressed, high, sharp, ragged; laterals long, slightly curved; cavity of the beaks shallow; cicatrices not deep. The shell is only a little thickened in front, and that of the female is slightly swollen at the posterior base.

Animal with the marsupium occupying the whole length of the outer gills; ovisacs not separated by a sulcus; gills long, inner a little the larger throughout, generally free their whole length from the abdominal sac; palpi enormous, wide, oval, slightly pointed behind, united two-thirds of their length to the mantle; mantle double on its edge; branchial opening large.

†UNIO POPEII Lea.

* *Unio popeii* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 102; * Jl. Ac. N. Sci. Phila., IV, 1858, p. 372, pl. LXVI, fig. 197; * Obs., VIII, 1860, p. 54, pl. LXVI, fig. 197.
* *Unio popei* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXI, fig. 430.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 164.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 605.
* *Margaron* (*Unio*) *popeii* LEA, Syn., 1870, p. 57.

South Texas; northeast Mexico.

†UNIO POEYANUS Lea.

* *Unio poeyanus* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 85; * Obs., VI, 1857, p. 3[illegible], pl. XXXII, fig. 30; * Jl. Ac. N. Sci. Phila., III, 1858, p. 315, pl. XXXII, fig. 30.—* SOWERBY, Conch. Icon., XVI, 1868, pl. XC, fig. 486.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 164.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 606.
* *Margaron* (*Unio*) *poeyanus* LEA, Syn., 1870, p. 57.

Rio de las Balsas, near Coyucan, Mexico.

UNIO VERÆ-PACIS Tristram.

* *Unio veræ-pacis* TRISTRAM, Proc. Zool. Soc. Lond., 1863, Pt. 3, p. 414.[1]—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 171.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 620.

Guatemala, Department of Vera Paz.

Section CANTHYRIA Swainson, 1840.

Shell inflated, suboval, spinose, with a high, rather sharp posterior ridge, above which it is somewhat truncated, the posterior slope being sometimes slightly wrinkled; beaks rather compressed, the sculpture not seen; epidermis smooth and shining, variegated with angular blotches; hinge sharply curved at the center; pseudocardinals rather compressed; laterals short, remote, the hinge plate narrowed; beak cavities rather deep. Animal with the marsupium occupying the whole of the outer gills, forming a smooth pad; branchiæ very large, round below, inner the larger, free nearly their whole length from the abdominal sac; palpi large; mantle double on its edge, sometimes with a few papillæ in front of the branchial opening; branchial opening small; superanal opening colored inside.[2]

† *Unio spinosus* LEA, Desc. of New Sp. Unio, 1836, colored figs.; * Tr. Am. Phil. Soc., VI, 1838, p. 57, pl. XVI, fig. 50; * Obs., II, 1838, p. 57, pl. XVI, fig. 50.—* JAY, Cat., 1839, p. 113, pl. V, figs. 1, 2.—* TROSCHEL, Arch. für Naturg., V, 1839, Pt. 2, p. 236.—* HANLEY, Test. Moll., 1842, p. 182; * Biv. Shells, 1843, p. 182, pl.

[1] Only a Latin description was given by Tristram, and the species is not identifiable. It is probably close to *U. popeii*, and may possibly be that.

[2] Notwithstanding the remarkable character of well-developed spines on the only species of this group, *U. spinosus*, the animal even when gravid does not present any striking peculiarities, and is certainly a *Unio*. I have seen one or two specimens of the *spinosus* with only one spine on one valve and none on the other, and one in the Lea collection *without spines*.

XXIII, fig. 56.—* CATLOW and REEVE, Conch. Nom., 1845, p. 64.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 257.—* KUSTER, Conch. Cab. Unio, 1856, p. 167, pl. XLIX, fig. 1.—* CHENU, Ill. Conch., 1858, pl. XXII, figs. 6, 6*a*, 6*b*.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XLIX, fig. 261.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 168.

* *Margarita* (*Unio*) *spinosus* LEA, Syn., 1836, p. 17, colored plate; 1838, p. 16.

* *Margaron* (*Unio*) *spinosus* LEA, Syn., 1852, p. 23; 1870, p. 35.

* *Canthyria spinosa* SWAINSON, Tr. on Mal., 1840, pp. 276, 378.—* AGASSIZ, Arch. für Nat., I, 1852, p. 44.

* *Unio spinosa* GOODRICH, Ill. Nat. Hist., II, 1859, p. 523, fig.

Altamaha River, Georgia.

Section UNIOMERUS Conrad, 1853.

(Type, *Unio tetralasmus* Say.)

Shell trapezoid, with a rounded posterior ridge, and pointed or feebly biangulate behind; beaks not prominent, sculptured with 10 to 15 curved, rather strong, concentric ridges, which sweep decidedly upward behind, where they are drawn somewhat closely together; epidermis generally rayless, often clothlike; pseudocardinals usually compressed; laterals delicate, slightly curved; muscle scars large, shallow, nacre generally lurid.

Animal with the marsupium occupying the whole length of the outer branchiæ, pad-like; gills large, inner the larger, free nearly or quite the length of the abdominal sac; mantle generally rather thick, thicker and double on the edge.

† UNIO TETRALASMUS Say.

* *Unio tetralasmus* SAY, Am. Conch., III, 1830, pl. XXIII.[1]—* FERUSSAC, Guer. Mag., 1835, p. 26.—* DESHAYES, An. sans. Vert., 2d ed., VI, 1835, p. 555; 3d ed., II, 1839, p. 674.—* HANLEY, Test. Moll., 1842, p. 198; * Biv. Shells, 1843, p. 198, pl. XXIII, fig. 49.—* CATLOW and REEVE, Conch. Nom., 1845, p. 64.—* CHENU, Bib. Conch., 1st ser., III, 1845, p. 52, pl. X, figs. 1-3.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 258.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 169.

[1] An abundant, widespread, and very variable species, and if there were no connecting links it would be easy to make a half dozen species out of it. The first described is the *Unio tetralasmus* Say, an elongated, rather smooth, more or less shining form, of which *excultus*, *jamesianus*, *parallelus*, *subcroceus*, and *symmetricus* seem to be synonymous, varying a little in form, color, and smoothness. The variety *camptodon* of Say is quite rhomboid, and is a rather rough, dark shell, and *U. symmetricus* is practically synonymous. Variety *decliris* is peculiarly drawn out at the post basal point. Variety *manubius* is a large, rather smooth form, rounded on the basal line. All these are Southern and Southwestern forms. Variety *sayi* is a yellowish shell, with very distinct rest marks, and has a more northern distribution than the rest, but it absolutely blends into them. Ward sent a description of his *U. sayi* to Tappan, who published it in the American Journal of Science and Arts under date of 1839. In Part XI of the Monography, dated November, 1838, Conrad describes *Unio sayanus* (changed to *sayi* in his notes) and refers it to Ward in the American Journal of Science and Arts of 1839. There is some mistake in these dates. In giving the synonymy it is hard to tell in all cases just what authors have meant.

**Margarita* (*Unio*) *tetralasmus* LEA, Syn., 1836, p. 30; 1838, p. 21.
**Margaron* (*Unio*) *tetralasmus* LEA, Syn., 1852, p. 32; 1870, p. 50.
**Unio excultus* CONRAD, Monog., XI, 1838, p. 99, pl. LIV, fig. 1; Pr. Ac. N. Sci. Phila., VI, 1853, p. 249.—* PÆTEL, Conch. Sam., III, 1890, p. 152.
*† *Unio parallelus* CONRAD, Pr. Ac. N. Sci. Phila., I, 1841, p. 20; * Jl. Ac. Phila., VIII, 1842, p. 179.[1]
*† *Unio symmetricus* LEA, Pr. Am. Phil. Soc., IV, 1845, p. 164; * Tr. Am. Phil. Soc., X, 1853, p. 73, pl. IV, fig. 11; * Obs., IV, 1848, p. 47, pl. IV, fig. 11.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 258.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 169.
**Margaron* (*Unio*) *symmetricus* LEA, Syn., 1852, p. 32; 1870, p. 52.
*† *Unio porrectus* CONRAD, Jl. Ac. N. Sci. Phila., 1854, p. 296, pl. XXVI, fig. 7.—* B. H. WRIGHT, Check List, 1888.
*† *Unio subcroceus* CONRAD, Jl. Ac. N. Sci. Phila., VII, 1854, p. 297, pl. XXVII, fig. 1.
**Unio jamesianus* LEA, Pr. Ac. N. Sci. Phila., I, 1857, p. 84; *Jl. Ac. N. Sci. Phila., IV, 1858, p. 53, pl. VI, fig. 35; * Obs., VI, 1858, p. 52, pl. VI, fig. 35.—* B. H. WRIGHT, Check List, 1888.
Margaron (*Unio*) *jamesianus* LEA, Syn., 1870, p. 50.

† UNIO TETRALASMUS var. CAMPTODON Say.

* *Unio camptodon* SAY, Am. Conch., V, 1832, pl. XIII.—* CONRAD, New F. W. Shells, 1834, p. 68.—* FERUSSAC, Guer. Mag., 1835, p. 26.—* HANLEY, Test. Moll., 1842, p. 198; * Biv. Shells, 1843, p. 198, pl. XXI, fig. 17.—* CHENU, Bib. Conch., 1st ser., III, 1845, p. 53, pl. XIV, figs. 2, 2*a*, 2*b*.—* CATLOW and REEVE, Conch. Nom., 1845, p. 56.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 246.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXX, fig. 356.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 147.—* STEARNS, Pr. U. S. Nat. Mus., XIV, 1891, p. 105.
**Margarita* (*Unio*) *camptodon* LEA, Syn., 1836, p. 30; 1838, p. 21.
**Margaron* (*Unio*) *camptodon* LEA, Syn., 1852, p. 32; 1870, p. 50.
*† *Unio geometricus* LEA, Tr. Am. Phil. Soc., V, 1832, p. 38, pl. IV, fig. 10; * Obs., I, 1834, p. 150, pl. IV, fig. 10.

† UNIO TETRALASMUS var. MANUBIUS Gould.

* *Unio manubius* GOULD, Pr. Bost. Soc. Nat. Hist., V, 1856, p. 229; * Otia Conch., 1862, p. 218.—* B. H. WRIGHT, Check List, 1888.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 592.
* *Margaron* (*Unio*) *manubius* GOULD, Syn., 1870, p. 54.
* *Unio manubrius* PÆTEL, Conch. Sam., III, 1890, p. 158.

† UNIO TETRALASMUS var. DECLIVIS Say.

Unio declivis SAY, Transylvania Jl. IV, 1831, p. 527; * Am. Conch., III, 1832, pl. XXXV.—* CONRAD, New F. W. Shells, 1834, p. 68.—* FERUSSAC, Guer. Mag., 1835, p. 26.—* DESHAYES, An. sans. Vert., 2d ed., VI, 1835, p. 556; 3d ed., II, 1839, p. 675.—* HANLEY, Test. Moll., 1842, p. 200; * Biv. Shells, 1843, p. 200, pl. XXIII, fig. 50.—* CHENU, Bib. Conch., 1st ser., III, 1845, p. 46, pl. XIII, figs. 1, 1*a*, 1*b*.—* CATLOW and REEVE, Conch. Nom., 1845, p. 58.—* KUSTER, Conch. Cab. Unio, 1852, p. 60, pl. XIV, fig. 1.—* CONRAD, Pr. Ac. N. Sci.

[1] This name had been used by Sowerby for a fossil *Unio*, and Conrad subsequently changed it to *porrectus* on that account, but Sowerby had also used that name for a *Unio*.

Phila., VI, 1853, p. 248.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 150.

* *Margarita* (*Unio*) *declivis* LEA, Syn., 1836, p. 32; 1838, p. 22.

* *Margaron* (*Unio*) *declivis* LEA, Syn., 1852, p. 33; 1870, p. 54.

UNIO TETRALASMUS var. SAYI Ward.

* *Unio sayi* WARD (in Tappan), Am. Jl. Sci., XXXV, 1839, p. 268, pl. III, fig. 1.—* CONRAD, Monog., XI, 1838[1], p. 102, pl. LV, fig. 2.[1]—* KUSTER, Conch. Cab. Unio, 1861, p. 246, pl. LXXXIII, fig. 1.—* PÆTEL, Conch. Sam., III, 1890, p. 166.

* *Unio sayanus* B. H. WRIGHT, Check List, 1888.

* *Unio electrinus* REEVE, Conch. Icon., XVI, 1865, pl. XXV, fig. 121.—* PÆTEL, Conch. Sam., III, 1890, p. 151.

Lower Mississippi drainage north to about latitude 40°; Ohio River system; Alabama River system and southwest through Texas into northern Mexico. Not reported, so far as I know, from the Tennessee and Cumberland rivers.

†UNIO COLUMBENSIS Lea.[2]

* *Unio columbensis* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 31; * Jl. Ac. N. Sci. Phila., IV, 1858, p. 75, pl. XIV, fig. 55; * Obs., VI, 1858, p. 75, pl. XIV, fig. 55.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *columbensis* LEA, Syn., 1870, p. 50.

* *Unio columbiensis* PÆTEL, Conch. Sam., III, 1890, p. 148.

Chattahoochee River, Georgia, west to Little Patsaliga Creek, Alabama.

†UNIO OBESUS Lea.

*?*Unio carolinensis* BOSC,[3] Hist. Nat. de Coq., 1824, III, p. 139, pl. XXIII, fig. 2.—* FERUSSAC, Guer. Mag., 1835, p. 26.—* CHENU, Ill. Conch., 1843, pl. XVIII, fig. 4.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 246.

* †*Unio obesus* LEA, Tr. Am. Phil. Soc., IV, 1831, p. 96, pl. XIII, fig. 26; * Obs., I, 1834, p. 106, pl. XIII, fig. 26.—* CONRAD, N. F. W. Shells, 1834, p. 70.—* HANLEY, Test. Moll., 1842, p. 198; * Biv. Shells, 1843, p. 198, pl. XXII, fig. 34.—* CATLOW and REEVE, Conch. Nom., 1845, p. 61.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—* CHENU, Ill. Conch., 1858, pl. XVIII, figs. 4, 4*a*, 4*b*.—* KUSTER, Conch. Cab. Unio, 1861, p. 196, pl. LXIII, fig. 2.—* REEVE, Conch. Icon., XVI, 1864, pl. XVIII, fig. 84.—* ?SOWERBY, Conch. Icon., XVI, 1866, pl. XXXVIII, fig. 212.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 161.—* SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 428, pl. LXVIII, fig. 6; LXIX, figs. 1, 2, 4; LXXI, fig. 3.

* *Margarita* (*Unio*) *obesus* LEA, Syn., 1836, p. 30; 1838, p. 21.

* *Margaron* (*Unio*) *obesus* LEA, Syn., 1852, p. 32; 1870, p. 50.

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[1] *Unio sayanus* on plate, *U. sayi* in note.

[2] This species almost merges into *obesus* on the one hand and the southern forms of *tetralasmus* on the other. The distribution of *obesus* is eastern, that of *tetralasmus* western, while *columbensis* occupies a central position in streams of the Gulf drainage.

[3] It is impossible to tell from the very poor figure what this is. Lea thinks it is *Margaritana margaritifera*, but Bosc did not visit any region where that species is found, and the figure seems to show lateral teeth. It is quite probably *U. obesus*. I think Lea's name had better be used.

* *Unio declivis* CONRAD, Monog., V, 1836, p. 45, pl. XXIII, fig. 1.

* † *Unio ineptus* LEA, Tr. Am. Phil. Soc., X, 1852, p. 261, pl. XV, fig. 12; * Obs., V, 1852, p. 17, pl. XV, fig. 12.—* CONRAD, Pr. Acad. N. Sci. Phila., VI, 1853, p. 250.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 155.

* *Margaron* (*Unio*) *ineptus* LEA, Syn., 1852, p. 31; 1870, p. 50.

* † *Unio hebes* LEA, Tr. Am. Phil. Soc., X, 1852, p. 267, pl. XVIII, fig. 21; * Obs., V, 1852, p. 23, pl. XVIII, fig. 21.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 250.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 154.

* *Margaron* (*Unio*) *hebes* LEA, Syn., 1852, p. 26; 1870, p. 51.

* † *Unio rivularis* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 257.—* CONRAD, Jl. Ac. N. Sci. Phila., 1854, p. 296.

* † *Unio cicur* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 39; * Jl. Ac. N. Sci. Phila., V, 1862, p. 93, pl. XIII, fig. 241.—* Obs., VIII, 1862, p. 96, pl. XIII, fig. 241.—B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *cicur* LEA, Syn., 1870, p. 52.

* *Unio squalidus* LEA, (part) [1] Pr. Ac. N. Sci. Phila., XV, 1863, p. 192.—* Jl. Ac. N. Sci. Phila., VI, 1866, p. 22, pl. VII, fig. 20; * Obs., XI, 1867, p. 26, pl. VII, fig. 20.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *squalidus* LEA, Syn., 1870, p. 51.

* † *Unio jewettii* LEA, Pr. Ac. N. Sci. Phila., XI, 1867, p. 81; * Jl. Ac. N. Sci. Phila., VI, 1868, p. 276, pl. XXXVII, fig. 89; *Obs., XII, 1869, p. 36, pl. XXVII, fig. 89.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *jewettii* LEA, Syn., 1870, p. 51.

* † *Unio pawensis* LEA,[2] Pr. Ac. N. Sci. Phila., XII, 1868, p. 161; * Jl. Ac. N. Sci Phila., VI, 1868, p. 302, pl. XLV, fig. 114; * Obs., XII, 1869, p. 62, pl. XLV, fig. 114.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *pawensis* LEA, Syn., 1870, p. 51.

* † *Unio rivicolus* CONRAD, Am. Jl. Conch., IV, 1868, p. 280, pl. XVIII, fig. 4.—* B. H. WRIGHT, Check List, 1888.

* † UNIO OBESUS var. BLANDINGIANUS Lea.

Unio blandingianus LEA, Tr. Am. Phil. Soc., V, 1834, p. 101, pl. XV, fig. 44;[3] * Obs., I, 1834, p. 213, pl. XV, fig. 44.—* FERUSSAC, Guer. Mag., 1835, p. 29.—* CONRAD, Monog., V, 1836, p. 46, pl. XXIII, fig. 2.—* HANLEY, Test. Moll., 1842, p. 200; * Biv. Shells, 1843, p. 200, pl. XXII, fig. 1.—* CATLOW and REEVE, Conch. Nom., 1845, p. 56.—* KUSTER, Conch. Cab. Unio, 1852, p. 36, pl. VI, fig. 2.—* CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 245.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXV, fig. 187.—* B. H. WRIGHT, Check List, 1888.—* S. H. WRIGHT, Conch. Ex., II, 1888, p. 95.—* PÆTEL, Conch. Sam., III, 1890, p. 146.

* *Margarita* (*Unio*) *blandingianus* LEA, Syn., 1836, p. 32; 1838, p. 22.

* *Margaron* (*Unio*) *blandingianus* LEA, Syn., 1852, p. 33; 1870, p. 54.

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[1] Under this name Dr. Lea has certainly described two species, a heavy quadrate, form biangulate behind, with purple nacre—a variety of *complanatus*—and another which is, no doubt, *U. obesus*, and is the shell figured.

[2] A rough, apparently diseased *obesus*.

[3] A decidedly trapezoidal form with cloth-like, dark epidermis, possibly worthy of a varietal name. The transition to the typical state is, however, very complete.

* † UNIO OBESUS var. PALUDICOLUS Gould.

* *Unio paludicolus* GOULD, Pr. Bost. Soc. Nat. Hist., II, 1845, p. 53.—* GOULD, Otia. Conch., 1852, p. 197.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *paludicolus* LEA, Syn., 1852, p. 33; 1870, p. 54.

* *Unio paludicolor* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 254.—* PÆTEL, Conch. Sam., III, 1890, p. 162.

Southern Virginia southward in streams draining into the Atlantic, and throughout the peninsula of Florida.

† UNIO BISSELLIANUS Lea.

* *Unio bisselliauus* LEA, Pr. Ac. N. Sci. Phila., XI, 1867, p. 81; * Jl. Ac. N. Sci. Phila., VI, 1868, p. 277, pl. XXXVII, fig. 90; * Obs., XII, 1869, p. 37, pl. XXXVII, fig. 90.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 146.

* *Margaron* (*Unio*) *bisselliauus* LEA, Syn., 1890, p. 50.

Bissell's Pond, Charlotte, North Carolina.

† UNIO SUBLURIDUS Simpson.

* *Unio subluridus* SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 432, pl. LXXIII, figs. 3, 4.

Orange Springs, Marion County, Florida. I can not be certain as to the relationship of this species, as the beaks are eroded in the only shells I have seen.

Section MICRONAIAS Simpson, 1900.

(Type, *Unio aratus* Lea.)

Shell small, oval, a little produced near the posterior base, with a moderate posterior ridge and pointed near the base behind; beaks rather prominent, the sculpture being apparently rather fine, irregularly concentric ridges, having a tendency to fall into two loops; the whole surface strongly and closely concentrically ridged; pseudocardinals compressed, high, slightly curved upward; laterals compressed, curved; beak cavities moderately deep; nacre whitish; anterior muscle scars deep, rough; posterior well marked.

Animal with the marsupium pad-like, occupying all but the extreme posterior part of the outer gills; branchiæ elongated, wider behind, inner the larger throughout, free from the abdominal sac or united to it;[1] palpi large, rounded behind; mantle with thickened border; anal opening crenulate.

[1] In some specimens free throughout; in others entirely united.

†UNIO ARATUS Lea.

* *Unio aratus* LEA, Disc. 12 Uniones, 1843; *Tr. Am. Phil. Soc., IX, 1845, p. 282, pl. XLII, fig. 12; *Obs., IV, 1848, p. 40, pl. XLII, fig. 12.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXIV, fig. 320.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 144.

* *Margaron* (*Unio*) *aratus* LEA, Syn., 1852, p. 28; 1870, p. 35.

Central America.

†UNIO GRANADENSIS Lea.

* *Unio granadensis* LEA, Pr. Ac. N. Sci. Phila., XII, 1868, p. 95; *Jl. Ac. N. Sci. Phila., VI, 1868, p. 293, pl. XLII, fig. 103; *Obs., XII, 1869, p. 53, pl. XLII, fig. 103.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *granadensis* LEA, Syn., 1870, p. 35.

Lake Nicaragua.

The following species are of Rafinesque, but I am utterly unable to make anything out of them:

Unio dilatata, elliptica, fasciata, fragilis, levigata, nervosa, viridis, zonata, all in Monograph, 1820; also *Unio bicolor, calendis, castaneus, chloris, diaphanus, fontinalis, fulvus, lasmabrachys, montanus, pallens, platiolus, rivularis, rimosus, teneltus, venus*, all in Continuation of Monograph, 1831.

Other indeterminate *Unionidæ* of Rafinesque are: *Amblema antrosa, costata, gibbosa, olivaria, rubra, torulosa; Lasmonos fragilis; Obovaria obovalis, pachostea; Obliquaria triangularis, attenuata, atroviolacea, bullata, cliffordiana, cuprea, cyphia, ellipsaria, fasciolaris, flava, flexuosa, lateralis, lineolata, nodulata, obliquata, pusilla, quadrula, sintoxia, sinuata, subrotunda*, all in Monograph, 1820. *Bariosta diploderma, ponderosus, vittatis; Epilobasma biloba; Toxolasma cinerescens, cyclips, flexus*, in Continuation of Monograph, 1831.

The following are also indeterminate and spurious Unios:

Unio tahetianus CATLOW and REEVE, Conch. Nom., 1845, p. 64. Is probably *U. taitianus* Lea.

Unio largillierti PHILIPPI, Menke's Zeits., 1847, p. 94.

Unio musicus SPENGLER, Skriv. Nat. Selsk., III, 1793, p. 67.

Unio radula SAY, N. Harm. Diss., 1829, p. 323.

Unio plombarius VILLA, Disp. Conch. Terr. Fluv., 1841, p. 62.

Unio pequottianus LINSLEY, Am. Jl. Sci., 1845, p. 277.

Unio iridescens CONRAD, Cov. of Monog. No. 11.

Unio angusta LAMARCK, An. sans. Vert., VI, 1819, p. 80.

Unio conus SPENGLER, Skriv. Nat. Selsk., 1792.

Unio delphinus SPENGLER, Skriv. Nat. Selsk., 1793, p. 63.

Unio doumeti LETOURNEUX and BOURGNIGNAT, Prod. Mal. Tunis., p. 163.

Unio distortus BEAN, Ann. and Mag., 1836, p. 376, fig. 53.

Unio uber CONRAD, Am. Jl. Conch., II, p. 279.

Mya oborata SOLANDER, Portland Cat., p. 100.

Genus PLEUROBEMA (Rafinesque, 1820) Agassiz.

(Type, *Unio clava* Lamarck.[1])

Pleurobema RAFINESQUE, Ann. Gen. Sci. Phys., Brux, 1820, p. 313.

Shell solid, triangular to rhomboid, usually with a prominent umbonal region; beaks at or near the anterior end of the shell, incurved and pointed forward over a small but well developed lunule; beak sculpture coarse, consisting of a few irregular, often broken ridges, which curve upward posteriorly; posterior ridge present, but low and rounded; epidermis showing the rest periods plainly, tawny to olive, often ornamented with rays which show a tendency to break into square spots; hinge rather strong, the plate generally narrow; pseudocardinals triangular, ragged; laterals reaching nearly or quite to the pseudocardinals, double in both valves, in the right valve the inner being smaller; muscle scars deep, the posterior rounded; cavity of the beaks shallow; nacre silvery; male and female shells essentially alike.

Animal having the inner gills much the larger, rounded below, free from the abdominal sac for a part or all of their length; marsupium occupying the entire outer gills, the ovisacs in some cases seeming to be arranged in pairs; animal generally yellowish to salmon red, sometimes more or less brown or blackish.

(Group of *Pleurobema clava*.)

Shell solid, triangular; beaks high, generally anterior; beak sculpture consisting of three or four broken, coarse, irregular ridges; epidermis yellowish or tawny, marked with broken green rays which show a tendency to form square spots; pseudocardinals often somewhat lengthened and more or less parallel with the laterals.

Animal having the inner gills the larger except at the extreme posterior end, free nearly or quite their whole length from the abdominal sac; marsupium occupying the entire outer gills; branchial opening rather large, with small papillæ; anal opening with minute papillæ or crenulations. Animal dirty whitish to salmon.

†PLEUROBEMA CLAVA Lamarck.

**Unio clava* LAMARCK, An. sans Vert., VI, 1819, p. 74.—*DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 537; 3d ed., II, 1839, p. 669.—*CONRAD, Monog., I, 1835, p. 5, pl. III, fig. 1.—*FERUSSAC, Guer. Mag., 1835, p. 28.—*CONRAD, Pr. Ac.

[1] I regret that I have not been able to examine more of the animals of this group, especially those of the gravid females. The shells on the one hand approach very close to those of *Quadrula* in appearance, and to *Unio* on the other hand. But all of them have shallow beak cavities, while those of *Quadrula* are deep, and the embryos of *Pleurobema* are contained in the outer gills only. The shells are generally more solid and more triangular than those of *Unio*, and the pattern of coloring is different from that of either genus. It stands between the two genera. I place *Unio æsopus* and *varicosus* in *Pleurobema* with some hesitation, though in a specimen of the former containing comparatively few embryos there were none in the inner gills, and their beak cavities are shallow.

N. Sci. Phila., VI, 1853, p. 246.—* KUSTER, Conch. Cab. Unio, 1852, p. 39, pl. VII, fig. 2.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXIX, fig. 354.

* *Pleurobema clava* AGASSIZ, Arch. für Naturg., I, 1852, p. 49.

* *Unio clavus* REEVE, Conch. Syst., I, 1841, p. 117, pl. LXXXVIII, fig. 3.—* HANLEY, Test. Moll., 1842, p. 187; * Biv. Shells, 1843, p. 187, pl. XX, fig. 52.—* CATLOW and REEVE, Conch. Nom., 1845, p. 57.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 148.—* CALL, Tr. Acad. Sci. St. Louis, VII, 1895, p. 9. pl. I.

* *Margarita* (*Unio*) *clavus* LEA, Syn., 1836, p. 22; 1838, p. 18.

* *Margaron* (*Unio*) *clavus* LEA, Syn., 1852, p. 26; 1870, p. 40.

* † *Unio patulus* LEA,[1] Tr. Am. Phil. Soc., III, 1829, p. 44, pl. XII, fig. 20; * Obs., I, 1834, p. 55, pl. XII, fig. 20.—* CONRAD, Monog., X, 1838, p. 92, pl. L, fig. 2.—* HANLEY, Test. Moll., 1842, p. 187; * Biv. Shells, 1843, p. 187, pl. XXII, fig. 27.—* CATLOW and REEVE, Conch. Nom., 1845, p. 62.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* CHENU, Ill. Conch., 1858, pl. XVI, figs. 6, 6*a*, 6*b*.—* KUSTER, Conch. Cab. Unio, 1861, p. 259, pl. LXXXVII, fig. 5.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 162.

* *Margarita* (*Unio*) *patulus* LEA, Syn., 1836, p. 22; 1838, p. 18.

* *Margaron* (*Unio*) *patulus* LEA, Syn., 1852, p. 26; 1870, p. 40.

* *Unio cuneatus* SAY, Am. Conch., VI, 1834.—* FERUSSAC, Guer. Mag., 1835, p. 28.

Ohio, Cumberland, and Tennessee river systems. Reported from Iowa City, Iowa; St. Peter's River, Minnesota, and from Nebraska.

† PLEUROBEMA MACULATA Conrad.

* *Unio maculatus* CONRAD, New F. W. Shells, 1834, p. 30, pl. IV, fig. 4, p. 70.—* FERUSSAC, Guer. Mag., 1835, p. 29.—MÖLLER, Syn. Nov. Gen., 1836, p. 202.—* HANLEY, Test. Moll., 1842, p. 203; * Biv. Shells, 1843, p. 203.—* CATLOW and REEVE, Conch. Nom., 1845, p. 60.—* CHENU, Bib. Conch., 1st ser., III, 1845. p. 17, pl. III, fig. 7.—* CONRAD, Pr. Ac. N. Sci., Phila., VI, 1853, p. 252.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* KUSTER, Conch. Cab. Unio, 1861, p. 216, pl. LXXII, fig. 2.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 158.

* *Margarita* (*Unio*) *maculatus* LEA, Syn., 1836, p. 34; 1838, p. 23.

* *Margaron* (*Unio*) *maculatus* LEA, Syn., 1852, p. 24; 1870, p. 38.[2]

Tennessee River system.

† PLEUROBEMA HOLSTONENSIS Lea.[3]

* *Unio holstonensis* LEA, Pr. Am. Phil. Soc., I, 1840, p. 288; * Tr. Am. Phil. Soc., VIII, 1842, p. 212, pl. XV, fig. 27; * Obs., III, 1842, p. 50, pl. XV, fig. 27.—* HAN-

[1] No specimen in the Lea collection exactly agrees with the figure of this species and Lea gives no exact locality for the type; but from a careful study of his shells and the figure and description I am convinced that it is a somewhat compressed form of the very variable *clava*, which has rather low beaks, that are not placed as far forward as usual. There seems to be a complete set of intermediates.

[2] Dr. Lea is inclined to believe (see above citation) that Conrad's *Unio maculatus* is the same as his own *ravenelianus*, and if this were the case Lea's name should have precedence. From an examination of specimens in the Philadelphia Academy of Natural Sciences and Conrad's figure and description, I am forced to differ from Dr. Lea, as I consider the species close to Lamarck's *clavus*.

[3] The type, a young shell, is certainly the same as *Unio lawii*, and there does not seem to be any material difference between it and the types of *U. bellulus* and *mundus*. The figure is hardly accurate.

LEY, Test. Moll., 1842, p. 213.—*CONRAD, Pr. Ac. N. Sci., Phila., VI, 1853, p. 250.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—*CHENU, Ill. Conch., 1858, pl. XXXII, figs. 1, 1*a*, 1*b*.—*KUSTER, Conch. Cab. Unio, 1862, p. 287, pl. XCVI, fig. 4.—*B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *holstonensis* LEA, Syn., 1852, p. 25; 1870, p. 38.

* *Unio mundus* LEA, Pr. Ac. N. Sci. Phila., I, 1857, p. 83; *Jl. Ac. N. Sci. Phila., VI, 1866, p. 40, pl. XIV, fig. 38; *Obs., XI, 1867, p. 44, pl. XIV, fig. 38.—*REEVE, Conch. Icon., XVI, 1864, pl. XVI, fig. 72.[1]—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 160.

* *Margaron* (*Unio*) *mundus* LEA, Syn., 1870, p. 40.

† * *Unio lawi* LEA, Pr. Ac. N. Sci. Phila., I, 1871, p. 189; *Jl. Ac. N. Sci. Phila., VIII, 1874, p. 8, pl. II, fig. 4; *Obs., XIII, 1874, p. 12, pl. II, fig. 4.—*B. H. WRIGHT, Check List, 1888.

† * *Unio pattinoides* LEA, Pr. Ac. N. Sci. Phila., I, 1871, p. 193; *Jl. Ac. N. Sci. Phila., VIII, 1874, p. 16, pl. IV, fig. 12; *Obs., XIII, 1874, p. 20, pl. IV, fig. 12.—*B. H. WRIGHT, Check List, 1888.

† * *Unio bellulus* LEA, Pr. Ac. N. Sci. Phila., II, 1872, p. 161; *Jl. Ac. N. Sci. Phila., VIII, 1874, p. 50, pl. XVII, fig. 48; *Obs., XIII, 1874, p. 54, pl. XVII, fig. 48.—B. H. WRIGHT, Check List, 1888.

Tennessee River system.

† PLEUROBEMA BOURNIANUS Lea.

* *Unio bournianus* LEA, Pr. Am. Phil. Soc., I, 1840, p. 288; *Tr. Am. Phil. Soc., VIII, 1842, p. 213, pl. XV, fig. 28; *Obs., III, p. 51, pl. XV, fig. 28.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 245.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—*CHENU, Ill. Conch., 1858, pl. XXVIII, figs. 2, 2*a*, 2*b*.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 146.

* *Maragron* (*Unio*) *bournianus* LEA, Syn., 1852, p. 25; 1870, p. 39.

Sciota River, near Chillicothe, Ohio.

† PLEUROBEMA EDGARIANUS Lea.

* *Unio edgarianus* LEA, Pr. Am. Phil. Soc., I, 1840, p. 288; *Tr. Am. Phil. Soc., VIII, 1842, p. 214, pl. XV, fig. 30; Obs., III, 1842, p. 52, pl. XV, fig. 30.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 248.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—*CHENU, Ill. Conch., 1858, pl. XXIX, figs. 5, 5*a*, 5*b*.—*KUSTER, Conch. Cab., 1861, p. 213, pl. LXX, fig. 5.—*MUSGRAVE, Phot. Conch., 1863, pl. II, fig. 6.—*REEVE, Conch. Icon., XVI, 1864, pl. XV, fig. 65.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 151.

* *Margaron* (*Unio*) *edgarianus* LEA, Syn., 1852, p. 25; 1870, p. 39.

† * *Unio obuncus* LEA, Pr. Ac. N. Sci., I, 1871, p. 192; *Jl. Ac. N. Sci., VIII, 1874, p. 9, pl. II, fig. 5; *Obs., XIII, 1874, p. 13, pl. II, fig. 5.—*B. H. WRIGHT, Check List, 1888.

† * *Unio andersonensis* LEA, Pr. Ac. N. Sci. Phila., II, 1872, p. 155; *Jl. Ac., N. Sci. Phila., VIII, 1874, p. 36, pl. XII, fig. 33; *Obs., XIII, 1874, p. 40, pl. XII, fig. 33.—*B. H. WRIGHT, Check List, 1888.

Tennessee River system.

[1] In the errata Reeve says this is not *mundus*, but that it is nearer *cuncolus* and *mooresianus*. I have compared it with authentic specimens, and it is certainly nearer *mundus* than either of the other mentioned species.

†PLEUROBEMA CUNEOLUS Lea.

* *Unio cuneolus* LEA, Pr. Am. Phil. Soc., I, 1840, p. 286; * Tr. Am. Phil. Soc., VIII, 1842, p. 193, pl. VII, fig. 3; *Obs., III, 1842, p. 31, pl. VII, fig. 3.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 247.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—*CHENU, Ill. Conch., 1858, pl. XXX, figs. 2, 2*a*, 2*b*.—* KUSTER, Conch. Cab. Unio, 1861, p. 182, pl. LXVII, fig. 4.—* REEVE, Conch. Icon., XVI, 1865, pl. XXIII, fig. 107.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 149.

* *Margaron* (*Unio*) *cuneolus* LEA, Syn., 1852, p. 24; 1870, p. 38.

†* *Unio clinchensis* LEA, Pr. Ac. N. Sci. Phila., XI, 1867, p. 81; *Jl. Ac. N. Sci. Phila., VI, 1868, p. 278, pl. XXXVII, fig. 91; *Obs., XII, 1869, p. 38, pl. XXXVII, fig. 91.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 148.

* *Margaron* (*Unio*) *clinchensis* LEA, Syn., 1870, p. 38.

Tennessee River system.

†PLEUROBEMA LESLEYI Lea.

* *Unio lesleyi* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 306; *Jl. Ac. N. Sci. Phila., IV, 1860, p. 352, pl. LVIII, fig. 177; *Obs., VIII, 1860, p. 34, pl. LVIII, fig. 177.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *lesleyi* LEA, Syn., 1870, p. 40.

Kentucky; Tennessee.

†PLEUROBEMA RAVENELIANA Lea.

* *Unio ravenelianus* LEA,[1] Tr. Am. Phil. Soc., V, 1834, p. 32, pl. III, fig. 5; *Obs., I, 1834, p. 144, pl. III, fig. 5.—* FERUSSAC, Guer. Mag., 1835, p. 29.—* HANLEY, Test. Moll., 1842, p. 187; *Biv. Shells, 1843, p. 187, pl. XX, fig. 59.—* CATLOW and REEVE, Conch. Nom., 1845, p. 63.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* KUSTER, Conch. Cab. Unio, 1862, p. 269, pl. XCI, fig. 1.—* REEVE, Conch. Icon., XVI, 1864, pl. XVI, fig. 70.—* B. H. WRIGHT, Check List, 1888.

* *Margarita* (*Unio*) *ravenelianus* LEA, Syn., 1836, p. 22; 1838, p. 18.

* *Margaron* (*Unio*) *ravenelianus*, LEA, Syn., 1852, p. 26; 1870, p. 40.

* *Unio rudis* CONRAD, Monog., IX, 1837, p. 76, pl. XLIII, fig. 1.—* CONRAD, Pr. Acad. N. Sci. Phila., VI, 1853, p. 257.

* *Unio decisus* KUSTER, (part) Conch. Cab. Unio, 1852, p. 41, pl. VIII, fig. 1.

Kentucky; Tennessee; western North Carolina.

†PLEUROBEMA OVIFORMIS Conrad.

* *Unio oviformis* CONRAD, New F. W. Shells, 1834, p. 46, pl. III, fig. 6; p. 70.—* FERUSSAC, Guer. Mag., 1835, p. 29.—* MÖLLER, Syn. Nov. Gen., 1836, p. 208.—*CHENU, Bib. Conch., 1st ser., III, 1845, p. 22, pl. II, fig. 7.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 254.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 162.

Margaron (*Unio*) *oviformis* LEA, Syn., 1852, p. 26; 1870, p. 40.

Tennessee.

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[1] In May, 1834, Conrad published a *Unio raveneli* in New Fresh Water Shells (p. 39) which belongs to the *complanatus* group. Lea's name, *ravenelianus*, appeared in August or September of the same year. Conrad, claiming priority for his name, substituted that of *Unio rudis* for Lea's species. As the names are really different, that of Lea had better stand.

†PLEUROBEMA ACUENS Lea.

* *Unio acuens* LEA, Pr. Ac. Nat. Sci. Phila., I, 1871, p. 190; * Jl. Ac. Nat. Sci. Phila., VIII, 1874, p. 27, pl. VIII, fig. 24; * Obs., XIII, 1874, p. 31, pl. VIII, fig. 24.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 143.

Tennessee River system.

†PLEUROBEMA ORNATA Lea.

* *Unio ornatus* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 4; * Jl. Ac. N. Sci. Phila., V, 1862, p. 85, pl. XI, fig. 234; * Obs., VIII, 1862, p. 89, pl. XI, fig. 234.—* PÆTEL, Conch. Sam., III, 1890, p. 162.

* *Margaron* (*Unio*) *ornatus* LEA, Syn., 1870, p. 57.[1]

Alabama.

†PLEUROBEMA APPRESSA Lea.

* *Unio appressus* LEA, Pr. Ac. N. Sci. Phila., I, 1871, p. 189; * Jl. Ac. N. Sci. Phila., VIII, 1874, p. 12, pl. III, fig. 8.—* Obs., III, 1874, pl. III, fig. 8.—* B. H. WRIGHT, Check List, 1888.

* *Unio argenteus* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXVII, fig. 204.

† *Unio tuscumbiensis* LEA, Pr. Ac. N. Sci. Phila., I, 1871, p. 191; * Jl. Ac. N. Sci. Phila., VIII, 1874, p. 11, pl. III, fig. 7; * Obs., XIII, 1874, p. 15, pl. III, fig. 7.—* B. H. WRIGHT, Check List, 1888.

* *Unio flavidus* LEA, Pr. Ac. N. Sci. Phila., II, 1872, p. 156; * Jl. Ac. N. Sci. Phila., VIII, 1874, p. 28, pl. IX, fig. 25; * Obs., XIII, 1874, p. 32, pl. IX, fig. 25.—* B. H. WRIGHT, Check List, 1888.

Tennessee River system.

†PLEUROBEMA TESSERULÆ Lea.

* *Unio tesserulæ* LEA, Pr. Ac. N. Sci. Phila., VI, 1861, p. 392; * Jl. Ac. N. Sci. Phila., VI, 1866, p. 40, pl. XV, fig. 39; * Obs., XI, 1867, p. 44, pl. XIV, fig. 38.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *tesserulæ* LEA, Syn., 1870, p. 36.

Nolachucky River, Tennessee.

†PLEUROBEMA VALIDA Lea.

* *Unio validus* LEA, Pr. Ac. N. Sci. Phila., I, 1871, p. 189; * Jl. Ac. N. Sci. Phila., VIII, 1874, p. 6, pl. I, fig. 2; * Obs., XIII, 1874, p. 10, pl. I, fig. 2.—* B. H. WRIGHT, Check List, 1888.

Tennessee.

†PLEUROBEMA ABACUS Haldeman.[2]

* *Unio abacus* HALDEMAN, Jl. Ac. N. Sci. Phila., VIII, 1842, p. 202.—* CONRAD, Pr. Ac. N. Sci. Phila., VI., 1853, p. 244.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 143.

* *Margaron* (*Unio*) *abacus* LEA, Syn., 1852, p. 24; 1870, p. 38

Tennessee and southwest Virginia.

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[1] The only specimen I have seen (the type) is a young shell, which I can not refer with certainty to any other species.

[2] As this species was not figured and I have not seen the type, I am unable to be absolutely certain what it is. In the Lea collection are four specimens labeled "*Unio abacus* Hald.," which are close to *appressus*.

†PLEUROBEMA SWORDIANA S. H. Wright.

* *Unio swordianus* S. H. WRIGHT, Naut., XI, 1897, p. 4.[1]

* *Pleurobema swordiana*, SIMPSON, Pr. Ac. N. Sci. Phila., 1900, p. 81, pl. IV, fig. 4.

Head waters of the Tennessee River.

†PLEUROBEMA TUMESCENS Lea.

* *Unio tumescens* LEA, Pr. Am. Phil. Soc., IV, 1845, p. 164; Tr. Am. Phil. Soc., X, 1848, p. 71, pl. III, fig. 7; Obs., IV, 1848, p. 45, pl. III, fig. 7.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 259.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 496.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 170.

* *Margaron* (*Unio*) *tumescens* LEA, Syn., 1852, p. 25; 1870, p. 38.

†* *Unio radiosus* LEA, Pr. Ac. N. Sci. Phila., I, 1871, p. 192; * Jl. Ac. N. Sci. Phila., VIII, 1874, p. 13, pl. III, fig. 9; * Obs., XIII, 1874, p. 17, pl. III, fig. 9.—* B. H. WRIGHT, Check List, 1888.

Tennessee. The localities, Alexandria, Louisiana, of Lea, for the type, and Ouachita River, Arkansas, given by Call, are open to doubt.

†PLEUROBEMA DOLABELLOIDES Lea.

* *Unio dolabelloides* LEA, Pr. Am. Phil. Soc., I, 1840, p. 288; * Tr. Am. Phil. Soc., VIII, 1842, p. 215, pl. XV, fig. 31; * Obs., III, 1842, p. 53, pl. XV, fig. 51.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 248.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—* CHENU, Ill. Conch., 1858, pl. XXIX, figs. 4, 4*a*, 4*b*.—* KUSTER, Conch. Cab., 1861, p. 214, pl. LXXI, fig. 3.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXVII, fig. 205.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 151.

* *Margaron* (*Unio*) *dolabelloides* LEA, Syn., 1852, p. 35; 1870, p. 56.

†* *Unio thorntonii*, LEA, Pr. Ac. N. Sci. Phila., I, 1857, p. 83; * Jl. Ac. N. Sci. Phila., VI, 1866, p. 38, pl. XIV, fig. 36; * Obs., XI, 1867, p. 42, pl. XIV, fig. 36.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 169.

* *Margaron* (*Unio*) *thorntonii* LEA, Syn., 1870, p. 56.

†* *Unio mooresianus* LEA, Pr. Ac. N. Sci. Phila., I, 1857, p. 83; * Jl. Ac. N. Sci. Phila., VI, 1866, p. 39, pl. XIV, fig. 37; * Obs., XI, 1867, p. 43, pl. XIV, fig. 37.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *mooresianus* LEA, Syn., 1870, p. 39.

* *Unio moorenianus* PÆTEL, Conch. Sam., III, 1890, p. 159.

†* *Unio recurvatus* LEA, Pr. Ac. N. Sci. Phila., I, 1871, p. 192; * Jl. Ac. N. Sci. Phila., VIII, 1874, p. 10, pl. II, fig. 6; * Obs., XIII, 1874, p. 14, pl. II, fig. 6.—* B. H. WRIGHT, Check List, 1888.

†* *Unio circumactus* LEA,[2] Pr. Ac. N. Sci. Phila., I, 1871, p. 192; * Jl. Ac. N. Sci. Phila., VIII, 1874, pl. IV, fig. 11; Obs., XIII, 1874, p. 19, pl. IV, fig. 11.—* B. H. WRIGHT, Check List, 1888.

Tennessee River drainage.

[1] I am a little in doubt as to the validity of this species.

[2] The figured type is certainly an adult, and that of *dolabelloides* the young of the same species.

† PLEUROBEMA SUBGLOBATA Lea.

* *Unio subglobatus* LEA, Pr. Ac. N. Sci. Phila., I, 1871, p. 191; * Jl. Ac. N. Sci. Phila., VIII, 1874, p. 7, pl. I, fig. 3; * Obs., XIII, 1874, p. 11, pl. I, fig. 3.—* B. H. WRIGHT, Check List, 1888.

Cumberland and Tennessee rivers.

† PLEUROBEMA CRUDA Lea.

* *Unio crudus* LEA, Pr. Ac. N. Sci. Phila., I, 1871, p. 190; * Jl. Ac. N. Sci. Phila., VIII, 1874, p. 14, pl. IV, fig. 10; * Obs., XIII, 1874, p. 18, pl. IV, fig. 10.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 149.

Cumberland, French Broad, and Holston rivers, Tennessee; Swamp Creek, Murray County, Georgia.

† PLEUROBEMA BARNESIANA Lea.

* *Unio barnesianus* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 31, pl. X, fig. 26; * Obs., II, 1838, p. 31, pl. X, fig. 26.—* TROSCHEL, Arch. für. Naturg., V, 1839, Pt. 2, p. 235.—* HANLEY, Test. Moll., 1842, p. 185; * Biv. Shells, 1843, p. 185, pl. XXIII, fig. 14.—* CATLOW and REEVE, Conch. Nom., 1845, p. 56.—* CONRAD Pr. Ac. N. Sci. Phila., VI, 1853, p. 245.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* CHENU, Ill. Conch., 1858, pl. XIX, figs. 2, 2*a*, 2*b*.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXIV, fig. 180.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 145.

* *Margarita* (*Unio*) *barnesianus* LEA, Syn., 1836, p. 20; 1838, p. 17.

* *Margaron* (*Unio*) *barnesianus* LEA, Syn., 1852, p. 24; 1870, p. 38.

* *Unio ravenelianus* REEVE, Conch. Icon., XVI, 1864, pl. XVI, fig. 70.

†* *Unio tellicoensis* LEA, Pr. Ac. N. Sci. Phila., II, 1872, p. 155; * Jl. Ac. N. Sci. Phila., VIII, 1874, p. 31, pl. X, fig. 28; * Obs., XIII, 1874, p. 35, pl. X, fig. 28.—* B. H. WRIGHT, Check List, 1888.

Cumberland and Tennessee river systems.

PLEUROBEMA LYONII Lea.

* *Unio lyonii* LEA, Pr. Ac. N. Sci. Phila., IX, 1865, p. 89; * Jl. Ac. N. Sci. Phila., VI, 1869, p. 259, XXXII, fig. 74; * Obs., XII, 1869, p. 19, pl. XXXII, fig. 74.—* B. H. WRIGHT, Check List, 1888.

Margaron (*Unio*) *lyonii* LEA, Syn., 1870, p. 56.

Tennessee River system.

PLEUROBEMA PUDICA Lea.

* *Unio pudicus* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 92; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 346, pl. LVI, fig. 171; * Obs., VIII, 1860, p. 28, pl. LVI, fig. 171.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXI, fig. 427.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 164.

* *Margaron* (*Unio*) *pudicus* LEA, Syn., 1870, p. 37.

* *Unio subrotundus* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXVII, fig. 201.

Tennessee River system.

† PLEUROBEMA BIGBYENSIS Lea.

* *Unio bigbyensis* LEA, Pr. Am. Phil. Soc., II, 1841, p. 30; * Tr. Am. Phil. Soc., VIII, 1843, p. 237, pl. XXII, fig. 51; * Obs., III, 1842, p. 75, pl. XXII, fig. 51.—

* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 245.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* CHENU, Ill. Conch., 1858, pl. XXII. figs. 5, 5*a*, 5*b*.—* KUSTER, Conch. Cab. Unio, 1862, p. 279, pl. XCIV, fig. 3.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XLI, fig. 227.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 146.

**Margaron* (*Unio*) *bigbyensis* LEA, Syn., 1852, p. 24, 1870, p. 38.

Tennessee River drainage; Indian Territory? Texas? The two last localities very doubtful.

(Group of *Pleurobema decisa*.)

Shell solid, inflated, ovate to elliptical, very inequilateral, somewhat truncated in front and rounded or bluntly pointed behind, wedge-shaped when looked at from above; base slightly angled in front, then nearly straight for two-thirds of its length, from whence it curves to the posterior point; beaks high, curved inward and forward; beak sculpture consisting of a few coarse, irregularly concentric ridges which curve slightly upward behind; epidermis tawny to brownish, rayless, the rest periods very distinctly marked by dark bands; pseudo-cardinals stumpy, ragged, often showing a tendency to elongation in the direction of the axis of the shell.

Animal having the branchiæ rather small, inner the larger, free nearly or quite the entire length of the abdominal sac, marsupium occupying all but the extreme posterior end of the outer gills; branchiæ and anal openings papillose.

†PLEUROBEMA DECISA Lea.

* *Unio decisus* LEA, Tr. Am. Phil. Soc., IV, 1831, p. 92, pl. XII, fig. 23; * Obs., I, 1834, p. 102, pl. XII, fig. 23.—* CONRAD, New F. W. Shells, 1834, p. 68.—* FERUSSAC, Guer. Mag., 1835, p. 28.—* CONRAD, Monog., I, 1835, p. 6, pl. III, fig. 2.—* HANLEY, Test. Moll., 1842, p. 187; Biv. Shells, 1843, p. 187, pl. XXII, fig. 21.—* CATLOW and REEVE, Conch. Nom., 1845, p. 58.—* KUSTER, Conch. Cab. Unio, 1852, p. 41, pl. VII, fig. 3.[1]—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 248.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* CHENU, Ill. Conch., 1858, pl. XVIII, figs. 3, 3*a*, 3*b*.—* REEVE, Conch. Icon., XVI, 1864, pl. XVI, fig. 71.—B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 150.

**Margarita* (*Unio*) *decisus* LEA, Syn., 1836, p. 21; 1838, p. 18.

**Margaron* (*Unio*) *decisus* LEA, Syn., 1852, p. 26; 1870, p. 40.

* *Unio scalenius* SAY, Am. Conch., VI, 1834.

†* *Unio anaticulus* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 40; *Jl. Ac. N. Sci. Phila., 1862, p. 92, pl. XIII, fig. 240; * Obs., VIII, 1862, p. 96, pl. XIII, fig. 240.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXVII, fig. 199.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 144.

**Margaron* (*Unio*) *anaticulus* LEA, Syn., 1870, p. 40.

* *Unio consanguineus* LEA, Pr. Ac. N. Sci. Phila., VI, 1861, p. 60; *Jl. Ac. N. Sci. Phila., V, 1862, p. 67, pl. VII, fig. 217; * Obs., VIII, 1862, p. 71, pl. VII, fig. 217.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXVIII, fig. 409.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 148.

**Margaron* (*Unio*) *consanguineus* LEA, Syn., 1870, p. 40.

[1] This figure is probably that of *U. decisus*. That on plate VIII, which he refers to that species, is most likely Lea's *ravenelianus*.

†* *Unio crebrivittatus* LEA, Pr. Ac. N. Sci. Phila., VI, 1861, p. 60; *Jl. Ac. N. Sci. Phila., VI, 1866, p. 43, pl. XV, fig. 41; *Obs., XI, 1867, p. 47, pl. XV, fig. 41.—*B. H. WRIGHT, Check List, 1888.

* *Margaron (Unio) crebrivittatus* LEA, Syn., 1870, p. 40.

*? *Unio medius* REEVE, Conch. Icon., XVI, 1864, pl. XVII, fig. 77.

Alabama and Tombigbee river systems.

† PLEUROBEMA CHATTANOOGAENSIS Lea.

* *Unio chattanoogaensis* LEA, Pr. Ac. N. Sci. Phila., II, 1858, p. 166; * Jl. Ac. N. Sci. Phila., IV, 1859, p. 209, pl. XXV, fig. 90; * Obs., VII, 1859, p. 27, pl. XXV, fig. 90.—* REEVE, Conch. Icon., XVI, 1864, pl. XVI, fig. 69.—B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 148.

* *Margaron (Unio) chattanoogaensis* LEA, Syn., 1870, p. 40.[1]

Alabama River system.

† PLEUROBEMA INTERVENTUS Lea.

* *Unio interventus* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 60; * Jl. Ac. N. Sci. Phila., V, 1862, p. 84, pl. XI, fig. 233; * Obs., VIII, 1862, p. 88, pl. XI, fig. 233.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 156.

* *Margaron (Unio) interventus* LEA, Syn., 1879, p. 40.

†* *Unio pallidofulvus* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 60; * Jl. Ac. N. Sci. Phila., V, 1862, p. 83, pl. XI, fig. 332; * Obs., VIII, 1862, p. 87, pl. XI, fig. 232.—*B. H. WRIGHT, Check List, 1888.

* *Margaron (Unio) pallidofulvus* LEA, Syn., 1870, p. 40.

Cahawba River, Alabama.

† PLEUROBEMA MURRAYENSIS Lea.

* *Unio murrayensis* LEA, Pr. Ac. N. Sci. Phila., II, 1868, p. 143; * Jl. Ac. N. Sci. Phila., VI, 1869, p. 303, pl. XLVI, fig. 115; * Obs., XII, 1869, p. 62, pl. XLVI, fig. 115.—* B. H. WRIGHT, Check List, 1888.

* *Margaron (Unio) murrayensis* LEA, Syn., 1870, p. 40.

Coosa River system; Columbus, Georgia?

(Group of *Pleurobema curta*.)

Shell elongate triangular, truncated in front, rounded on the base where it is quite full behind the middle, with a low posterior ridge, the space between the middle of the disk and the ridge flattened or sometimes slightly excavated, rather sharply pointed behind; umbonal region very prominent; beaks well forward; beak sculpture not observed; epidermis rather smooth, brownish olive; pseudocardinals distinct, triangular, radiate; laterals heavy, slightly curved; cicatrices small and deep; nacre iridescent posteriorly. Animal with the gills large, semicircular, the outer slightly larger than the inner, which are free nearly their whole length from the abdominal sac; marsupium occupying the entire length of the outer gills.

[1] Probably did not come from Chattanooga, Tennessee, as Dr. Lea believes, but from some of the streams of northern Georgia or Alabama, which drain southward. According to Hon. T. H. Aldrich, the animal of this and allied species is a brilliant scarlet.

†PLEUROBEMA CURTA Lea.

* *Unio curtus* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 112; *Jl. Ac. N. Sci. Phila., V, 1862, p. 103, pl. XVII, fig. 253; *Obs., VIII, 1862, p. 107, pl. XVII, fig. 256.—*B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *curtus* LEA, Syn., 1870, p. 40.

Tombigbee River, Columbus, Mississippi.

(Group of *Pleurobema troscheliana.*)

Shell rather small, solid, rounded-triangular, inflated, somewhat inequilateral, slightly pointed near the posterior base, and rounded angular at the hinder end of the ligament; base of the shell almost evenly rounded; posterior ridge low; beaks high and slightly curved inward and forward over a well-defined lunule; epidermis dull tawny, showing the rest periods and occasionally marked with a radiating row of dark green, squarish spots in front of the posterior ridge; hinge plate wide and flat; pseudocardinals small, triangular, rough; laterals short, curved; muscle scars small, rather deep. Animal with semicircular gills, the inner the larger and free from the abdominal sac half to nearly their whole length; ovisacs of outer gills apparently in pairs.

†PLEUROBEMA TAITIANA Lea.

* *Unio taitianus* LEA, Tr. Am. Phil. Soc., V, 1834, p. 39, pl. IV, fig. 11; *Obs., I, 1834, p. 151, pl. IV, fig. 11.—*FERUSSAC, Guer. Mag., 1835, p. 29.—*HANLEY, Test. Moll., 1842, p. 186; *Biv. Shells, 1843, p. 186, pl. XXIII, fig. 26.—*CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 258.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 496.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 169.

* *Margarita* (*Unio*) *taitianus* LEA, Syn., 1836, p. 21; 1838, p. 18.

* *Margaron* (*Unio*) *taitianus* LEA, Syn., 1852, p. 25; 1870, p. 38.

Alabama River.

†PLEUROBEMA COR Conrad.

* *Unio mytilloides* CONRAD, Am. Jl. Sci., XXV, 1834, p. 343, pl. I, fig. 7.[1]

* *Unio cor* CONRAD, New F. W. Shells, 1834, p. 28, pl. III, fig. 3, p. 68.—*FERUSSAC, Guerin Mag., 1835, p. 29.—*MÖLLER, Syn. Nov. Gen., 1836, p. 202.—*HANLEY, Test. Moll., 1842, p. 187; *Biv. Shells, 1843, p. 187.—*CHENU, Bib. Conch., 1st

[1] Conrad says this is between *Unio ellipsis* Lea and *mytilloides* Rafinesque, but that he has no doubt that it is the latter. It is certainly very different from the shell Rafinesque figures and describes as *Pleurobema mytilloides.* (Ann. Gen. Sci. Phys. Brux., XIII, 1820, p. 313, pl. LXXXII, figs. 8-10.) Conrad's *Unio cor* was published in May, 1834, and his *mytilloides* in January of the same year, so that the latter has priority, but as Rafinesque's name was placed under the genus *Pleurobema,* and as I place Conrad's species, which is an entirely different thing, in the same genus, the name *mytilloides* can not be used for it, and it must therefore take the next name proposed, which is Conrad's *cor.*

Dr. Lea admits Rafinesque's *mytilloides* with doubt, and in his collection places under that name specimens which I regard as a rather elongated *Quadrula pyramidata.* Rafinesque's figure represents an elongated shell, almost absolutely straight on the dorsal line, and with the beaks carried far in front of the rest of the shell. I have never seen any thing which at all agrees with it.

ser., III, 1845, p. 16, pl. III, fig. 2.—*CATLOW and REEVE, Conch. Nom., 1845, p. 57.—*CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 247.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 149.

**Margarita* (*Unio*) *cor* LEA, Syn., 1836, p. 21; 1838, p. 18.

**Margaron* (*Unio*) *cor* LEA, Syn., 1852, p. 26; 1870, p. 39.

† **Unio crapulus* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 39; *Jl. Ac. N. Sci. Phila., VI, 1866, p. 42, pl. XV, fig. 40; *Obs., XI, 1867, p. 46, pl. XV, fig. 40.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *crapulus* LEA, Syn., 1870, p. 41.

† **Unio lewisii* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 40; *Jl. Ac. N. Sci. Phila., V, 1862, p. 71, pl. VIII, fig. 220; *Obs., VIII, 1862, p. 75, pl. VIII, fig. 220.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *lewisii* LEA, Syn., 1870, p. 56.

Alabama River system; Flint River, Georgia.

† PLEUROBEMA PEROVATA Conrad.

**Unio perovatus* CONRAD, Am. Jl. of Sci., XXV, 1834, p. 338, pl. L, fig. 3; *?New F. W. Shells, 1834, p. 47, pl. II, fig. 3.[1]—FERUSSAC, Guer. Mag., 1835, p. 29—*MÖLLER, Syn. Nov. Gen., 1836, p. 199; *Test. Moll., 1842, p. 190.—*HANLEY, Biv. Shells, 1843, p. 190.—*CHENU, Bib. Conch., 1st ser., III, 1845, p. 22, pl. I, fig. 3.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 254.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—*B. H. WRIGHT, Check List, 1888.

**Margarita* (*Unio*) *perovatus* LEA, Syn., 1836, p. 23; 1838, p. 19.

Margaron (*Unio*) *perovatus* LEA, Syn., 1852, p. 27; 1870, p. 42.

Prairie Creek (tributary of the Tombigbee), Marengo County, Alabama.

† PLEUROBEMA NUCLEOPSIS Conrad.

Unio nucleopsis CONRAD, Ann. and Mag. Nat. Hist., IV, 1849, p. 301;[2] *Pr. Ac. N. Sci. Phila., IV, 1849, p. 154; *Jl. Ac. N. Sci. Phila., I, 1850, p. 276, pl. XXXVII, fig. 81.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—*KUSTER, Conch. Cab. Unio, 1861, p. 217, pl. LXXIII, fig. 3.—*REEVE, Conch. Icon., XVI, 1864, pl. XVI, fig. 68.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 161.

**Margarita* (*Unio*) *nucleopsis* LEA, Syn., 1852, p. 35; 1870, p. 56.

Coosa River system.

† PLEUROBEMA STABILIS Lea.

**Unio stabilis* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 59; *Jl. Ac. N. Sci. Phila., V, 1862, p. 71, pl. VIII, fig. 221; *Obs., VIII, 1862, p. 75, pl. VIII, fig. 221.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *stabilis* LEA, Syn., 1870, p. 38.

† *Unio medius* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 40; *Jl. Ac. N. Sci. Phila., V, 1861, p. 78, pl. X, fig. 227; *Obs., VIII, 1862, p. 82, pl. X, fig. 227.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXXIII, fig. 375.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 158.

Margaron (*Unio*) *medius* LEA, Syn., 1870, p. 40.

Coosa River, Alabama.

[1] This figure differs a good deal from that in the American Journal of Science, and it may be taken from a younger, less inflated shell.

[2] Very close to *P. irrasa*, and it may be that when a sufficient amount of material is examined the two will have to be placed together.

†PLEUROBEMA TROSCHELIANA Lea.

**Unio troschelianus* LEA, Tr. Am. Phil. Soc., X, 1852, p. 280, pl. XXIII, fig. 39; *Obs., V, 1852, p. 36, pl. XXIII, fig. 39.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 496.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 170.

**Margaron* (*Unio*) *troschelianus* LEA, Syn., 1852, p. 26; 1870, p. 40.

Alabama River system.

PLEUROBEMA IRRASA Lea.

**Unio irrasus* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 38; *Jl. Ac. N. Sci. Phila., V, 1862, p. 91, pl. XIII, fig. 239; *Obs., VIII, 1862, p. 95, pl. XIII, fig. 239.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *irrasus* LEA, Syn., 1870, p. 38.

Coosa River system.

†PLEUROBEMA ALTA Conrad.

**Unio altus* CONRAD, Jl. Ac. N. Sci. Phila., II, 1854, p. 298, pl. XXVII, fig. 5.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *altus* LEA, Syn., 1870, p. 42.

† **Unio fibuloides* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 154; Jl. Ac. N. Sci. Phila., IV, 1859, p. 219, pl. XXVIII, fig. 100; *Obs., VII, 1859, p. 37, pl. XXVIII, fig. 100.—*SOWERBY, Conch. Icon., XVI, 1866, pl. XLI, fig. 223.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 152.

Margaron (*Unio*) *fibuloides* LEA, Syn., 1870, p. 56.

Connasauga River, Georgia.

†PLEUROBEMA HARTMANIANA Lea.

**Unio hartmanianus* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 307; *Jl. Ac. N. Sci. Phila., V, 1862, p. 73, pl. VIII, fig. 222; *Obs., VIII, 1862, p. 77, pl. VIII, fig. 222.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *hartmanianus* LEA, Syn., 1870, p. 38.

Coosa River, Alabama.

Dr. Lea has shells in his collection from the Clinch River which he places with this species, which I am certain belong to the *Clava* group.

†PLEUROBEMA INSTRUCTA Lea.

**Unio instructus* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 59; *Jl. Ac. N. Sci. Phila., V, 1862, p. 82, pl. X, fig. 230; *Obs., VIII, 1862, p. 86, pl. X, fig. 230.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *instructus* LEA, Syn., 1870, p. 38.

Cahawba River, Alabama.

(Group of *Pleurobema showalterii*.)

Shell small, rounded triangular, inflated, slightly truncated anteriorly, posterior end arched and ending in a bluntly rounded point at the post base, posterior ridge well defined; umbonal region full; beaks rather prominent, the sculpture not observed; epidermis brown, not rayed; hinge plate rather wide; pseudocardinals small, triangular,

radial, roughened; laterals short, heavy, nacre white, brilliantly irides cent posteriorly; beak cavities shallow.

Animal apparently having ovisacs in pairs which are slightly wavy and lirate at the base; gills rather large, semicircular, inner much the larger, partly free from the abdominal sac; mantle thin, thickened at edge, and bordered with a dark line.[1]

†PLEUROBEMA SHOWALTERII Lea.

* *Unio showalterii* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 307; *Jl. Ac. N. Sci. Phila., V, 1862, p. 73, pl. VIII, fig. 223; Obs., VIII, 1862, p. 77, pl. VIII, fig. 223.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXI, fig. 426.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p.167.

* *Margaron* (*Unio*) *showalterii* LEA, Syn., 1870, p. 55.

Coosa River, Alabama.

(Group of *Pleurobema nux.*)

Shell oval, inflated, moderately solid, with a low posterior ridge, swollen at the post-basal part; posterior end pointed at the termination of the posterior ridge; beaks full, rather high, considerably removed from the anterior end; epidermis pale to dark brown, rest lines very distinct; pseudocardinals small, stumpy, radiate, rough, laterals straight; nacre brilliantly iridescent posteriorly; front part of shell heavy, suddenly becoming thinner behind.

Animal unknown.

†PLEUROBEMA VERA Lea.

* *Unio verus* LEA, Pr. Ac. N. Sci. Phila., V, 1860, p. 140; *Jl. Ac. N. Sci. Phila., V, 1862, p. 83, pl. XI, fig. 231; * Obs., VIII, 1862, p. 87, pl. XI, fig. 231.—*B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *verus* LEA, Syn., 1870, p. 38.

Black Warrior and Cahawba rivers, Alabama.

†PLEUROBEMA HAGLERI Frierson.

* *Unio* (*Pleurobema*) *hagleri* FRIERSON, Nautilus, XIII, 1900, p. 109, pl. II.

North River, Alabama, near Tyner.

†PLEUROBEMA RUBELLA Conrad.

* *Unio rubellus* CONRAD, New F. W. Shells, 1834, p. 38, pl. VI, fig. 2, p. 71.—*FERUSSAC, Guer. Mag., 1835, p. 29.—*MÖLLER, Syn. Nov. Gen., 1836, p. 205.—*HANLEY, Test. Moll., 1842, p. 201; *Biv. Shells, 1843, p. 201.—*CHENU, Bib. Conch., 1st ser., III, 1845, p. 20, pl. II, fig. 2.—*CATLOW and REEVE, Conch. Nom., 1845, p. 63.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 257.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 166.

[1] The single species which I place in this group is quite variable. Some specimens approach *Quadrula solida* and *trigona* in general shape, while others are more like *Pleurobema irrasa* and *troscheliana*. I judge from the character of the gills that the marsupium is confined to the outer pair.

**Margarita* (*Unio*) *rubellus* LEA, Syn., 1836, p. 33; 1838, p. 28.
**Margaron* (*Unio*) *rubellus* LEA, Syn., 1852, p. 34; 1870, p. 55.
† **Unio rudis* CONRAD,[1] Monog., No. 9, 1837, p. 76, pl. XLIII, fig. 1.—*B. H. WRIGHT, Check List, 1888.
† **Unio pulvinulus* LEA, Pr. Am. Phil. Soc., IV, 1845, p. 164; *Tr. Am. Phil. Soc., X, 1848, p. 81, pl. VIII, fig. 24; *Obs., IV, 1848, p. 55, pl. VIII, fig. 24.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 255.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 164.
**Margaron* (*Unio*) *pulvinulus* LEA, Syn., 1852, p. 26; 1870, p. 41.

Black Warrior and Cahawba rivers, Alabama.

† PLEUROBEMA FURVA Conrad.[2]

**Unio furvus* CONRAD, New F. W. Shells, 1834, p. 39, pl. VI, fig. 3, page 69.—*FERUSSAC, Guer. Mag., 1835, p. 29.—*MÖLLER, Syn. Nov. Gen., 1836, p. 205.—*CHENU, Bib. Conch., 1st ser., III, 1845, p. 20, pl. II, fig. 4.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 250.—*B. H. WRIGHT, Check List, 1888.

Black Warrior River, Alabama.

† PLEUROBEMA AVELLANA Simpson.

**Pleurobema avellana* SIMPSON, Pr. Ac. N. Sci. Phila., 1900, p. 81, pl. II, figs. 6, 7.

Cahawba River, Alabama.

† PLEUROBEMA NUX Lea.

* *Unio nux* LEA, Tr. Am. Phil. Soc., X, 1852, p. 283, pl. XXIV, fig. 43; *Obs. V, 1852, p. 39, pl. XXIV, fig. 43.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 161.
* *Margaron* (*Unio*) *nux* LEA, Syn., 1852, p. 31; 1870, p. 49.
† *Unio cinnamomicus* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 39; *Jl. Ac. N. Sci. Phila., V, 1862, p. 100, pl. XVI, fig. 248; *Obs., VIII, 1862, p. 104, pl. XVI, fig. 248.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXIII, fig. 438.—*B. H. WRIGHT, Check List, 1888.
* *Margaron* (*Unio*) *cinnamomicus* LEA, Syn., 1870, p. 49.

Alabama River system.

† PLEUROBEMA PINKSTONI S. H. Wright.

* *Unio pinkstoni* S. H. WRIGHT, Nautilus, X, 1897, p. 136.
* *Pleurobema pinkstoni* SIMPSON, Pr. Ac. N. Sci. Phila., 1900, p. 81, pl. I, fig. 8.

Alabama River system.

[1] Conrad says that *U. ravenelianus* of Lea is the same as his *U. rudus*, which, according to Ravenel, is found in the French Broad River, though Conrad obtained his species in the Black Warrior. The species of Conrad is, however, quite distinct from that of Lea, the two never occurring in the same drainage system.

[2] I have seen what I believe are specimens of this species from the collections of the Hon. T. H. Aldrich and Mr. Bryant Walker, taken from the Black Warrior River, Alabama, but I think it not improbable that it may run into *P. rubella*.

†PLEUROBEMA JOHANNIS Lea.

* *Unio johannis* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 171; *Jl. Ac. N. Sci. Phila., IV, 1860, p. 340, pl. LV, fig. 168; *Obs., VIII, 1860, p. 25, pl. LV, fig. 168.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *johannis* LEA, Syn., 1870, p. 41.

Alabama River system.

†PLEUROBEMA HANLEYANA Lea.

* *Unio hanleyanus* LEA, Tr. Am. Phil. Soc., X, 1852, p. 279, pl. XXIII, fig. 37; *Obs., V, 1852, p. 35, pl. XXIII, fig. 37.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* REEVE, Conch. Icon., XVI, 1864, pl. XVII, fig. 76.[1]—* SOWERBY, Conch. Icon., XVI, 1866, pl. XLVI, fig. 249.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 154.

* *Margaron* (*Unio*) *hanleyanus* LEA, Syn., 1852, p. 26; 1870, p. 40.

Coosa River drainage, Georgia and Alabama.

†PLEUROBEMA FLAVIDULUS Lea.

* *Unio flavidulus* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 39; *Jl. Ac. N. Sci. Phila., V, 1862, p. 97, pl. XV, fig. 245; *Obs., VIII, 1862, p. 101, pl. XV, fig. 245.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *flavidulus* LEA, Syn., 1870, p. 40.

Columbus, Mississippi.

(Group of *Pleurobema bulbosa.*)

Shell elongate oval, solid, inflated, with a high posterior ridge, ending in a point behind, above which it is feebly wrinkled; beaks full, sculpture not seen; epidermis smooth, dark, rayless; hinge strong; pseudocardinals heavy, torn, sometimes a small third one in the left valve; laterals heavy, club-shaped, granulate, two in the left valve and one and a small secondary lateral in the right. Animal unknown.

†PLEUROBEMA BULBOSA Lea.

* *Unio bulbosus* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 172; *Jl. Ac. N. Sci. Phila., IV, 1859, p. 191, pl. XXI, fig. 75; *Obs., VII, 1859, p. 9, pl. XXI, fig. 75.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *bulbosus* LEA, Syn., 1870, p. 40.

Ocmulgee and Flint rivers, Georgia.

†PLEUROBEMA HARPERI B. H. Wright.

* *Unio harperi* B. H. WRIGHT, Naut., XIII, 1899, p. 6.

* *Pleurobema harperi* SIMPSON, Pr. Ac. N. Sci. Phila., 1900, p. 81, pl. I, fig. 10.

Altamaha and Flint rivers, Georgia; Suwanee River, Florida.[2]

[1] Reeve states in his errata that this is not *Unio hanleyanus*. The figure agrees fairly well with the type of that species.

[2] This may prove to be a variety of *P. bulbosa*.

†PLEUROBEMA RECLUSA B. H. Wright.

* *Unio reclusus* B. H. WRIGHT, Naut., XI, 1898, p. 3.
* *Pleurobema reclusa* SIMPSON, Pr. Ac. N. Sci. Phila., 1900, p. 82, pl. I, fig. 2.

Ocklocknee River, Leon County, Florida.

(Group of *Pleurobema brumbyana.*)

Shell oval, inflated, moderately solid, faintly swollen at post basal region; beaks rather prominent, somewhat distant from the anterior end; beak sculpture not seen; disks irregularly, concentrically sculptured; epidermis dark olive to blackish, striate; pseudocardinals subradiate, slightly compressed; beak cavities shallow; nacre iridescent posteriorly, somewhat thickened in front.

†PLEUROBEMA BRUMBYANA Lea.

* *Unio brumléyanus* LEA,[1] Proc. Am. Phil. Soc., II, 1841, p. 82.
* *Unio brumbyanus* LEA, Tr. Am. Phil. Soc., VIII, 1842, p. 245, pl. XXVI, fig. 62; * Obs., III, 1842, p. 83, pl. XXVI, fig. 62.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 245.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 146.
* *Margaron (Unio) brumbyanus* LEA, Syn., 1852, p. 31; 1870, p. 49.
† * *Unio concolor* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 40; * Jl. Ac. N. Sci. Phila., V, 1862, p. 89, pl. XII, fig. 237; * Obs., VIII, 1862, p. 93, pl. XII, fig. 237.—* SOWERBY, Conch. Icon, XVI, 1868, pl. LXXXIII, fig. 440.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1870, p. 148.
* *Margaron (Unio) concolor* LEA, Syn., 1870, p. 49.

Alabama River system.

(Group of *Pleurobema argentea.*)

Shell solid, oval to rhomboid, generally compressed, beaks high but not inflated, well removed from the anterior end, with strong, irregular sculpture, which is curved up and swollen behind where the bars are slightly looped; epidermis brownish to straw color, sometimes having a few broken, blotched rays; teeth strong; cicatrices deep and distinct. Animal unknown.[2]

†PLEUROBEMA SIMULANS Lea.

* *Unio simulans* LEA, Pr. Acad. N. Sci. Phila., I, 1871, p. 190; * Jl. Acad. N. Sci. Phila., VIII, 1874, p. 18, pl. V, fig. 15; * Obs., XIII, 1874, p. 22, pl. V, fig. 15.—* B. H. WRIGHT, Check List, 1888.

Black Warrior and Cahawba rivers, Alabama; Pine Barren Creek, Escambia County, Florida.

[1] So written in Proceedings; no doubt a typographical error, as the species was named after Brumby.

[2] The species placed here are puzzling and seem to stand between *Unio* and *Pleurobema*. The color and the beak sculpture incline me to place them with the latter, and some of the species seem to show relationship with such forms as *P. pudica* and *bigbyana*.

† PLEUROBEMA STRODEANA B. H. Wright.

* *Unio strodeanus* B. H. WRIGHT, Nautilus, XII, 1898, p. 5.
* *Pleurobema strodeana* SIMPSON, Pr. Ac. N. Sci. Phila., 1900, p. 81, pl. I, fig. 3.

Escambia River, Florida; Flint River, Rhoadsville, Georgia.

† PLEUROBEMA PATSALIGENSIS Simpson

* *Pleurobema patsaligensis* SIMPSON, Pr. Ac. N. Sci. Phila., 1900, p. 82, pl. II, fig. 1.

Little Patsaliga Creek, southeast Alabama.

† PLEUROBEMA FAVOSA Lea.

* *Unio favosus* LEA, Proc. Acad. N. Sci. Phila., VIII, 1856, p. 262; * Jl. Acad. N. Sci. Phila., IV, 1858, p. 58, pl. VIII, fig. 40; * Obs., VI, p. 58, pl. VIII, fig. 40.—* SOWERBY, Conch. Icon., XVI, 1868, pl. XC, fig. 488.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 151.
* *Margaron* (*Unio*) *favosus* LEA, Syn., 1870, p. 38.

Alabama River system.

† UNIO LENTICULARIS Lea.

* *Unio lenticularis* LEA, Pr. Acad. N. Sci. Phila., II, 1872, p 155; * Jl. Acad. N. Sci. Phila., VIII, 1874, p. 30, pl. IX, fig. 27; * Obs., XIII, 1874, p. 34, pl. IX, fig. 27.—* B. H. WRIGHT, Check List, 1888.

Tellico River, Monroe County, Tennessee; East Tennessee.

† PLEUROBEMA MEREDITHII Lea.

* *Unio meredithii* LEA, Pr. Acad. N. Sci. Phila., II, 1858, p. 40; *Jl. Acad. N. Sci. Phila., V, 1862, p. 65, pl. VI, fig. 214; *Obs., VIII, 1862, p. 69, pl. V, fig. 214.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 159.
* *Margaron* (*Unio*) *meredithii* LEA, Syn., 1870, p. 35.

Tennessee River system; Black Warrior River, Alabama.

† PLEUROBEMA LITA Lea.

* *Unio litus* LEA, Pr. Acad. N. Sci. Phila., I, 1871, p. 189; *Jl. Acad. N. Sci. Phila., VIII, 1874, p. 17, pl. V, fig. 13; * Obs., XIII, 1874, p. 21, pl. V, fig. 13.—* B. H. WRIGHT, Check List, 1888.

Cahawba and Black Warrior rivers, Alabama.

PLEUROBEMA GEORGIANA Lea.

* *Unio georgianus* LEA, Pr. Am. Phil. Soc., II, 1841, p. 31;[1] * Tr. Am. Phil. Soc., VIII, 1842, p. 235, pl. XXI, fig. 49; * Obs., III, 1842, p. 73, pl. XXI, fig. 49.—* CONRAD, Pr. Acad. N. Sci. Phila., VI, 1853, p. 250.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* CHENU, Ill. Conch., 1858, pl. XXXII, figs. 3, 3*a*, 3*b*.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 153.
* *Margaron* (*Unio*) *georgianus* LEA, Syn., 1852, p. 27; 1870, p. 42.

Stump Creek, northwest Georgia.

[1] I have only seen a single specimen of this, the type, in bad condition, and I can not be certain where it belongs.

†PLEUROBEMA PYRIFORMIS Lea.

**Unio pyriformis* LEA, Pr. Ac. N. Sci. Phila., IX, 1857, p. 31; * Jl. Ac. N. Sci. Phila., IV, 1858, p. 69, pl. XII, fig. 50; * Obs., VI, 1858, p. 69, pl. XII, fig. 50.—* B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *pyriformis* LEA, Syn., 1870, p. 40.

Near Columbus, Georgia.

†PLEUROBEMA MODICA Lea.

**Unio modicus* LEA, Pr. Acad. N. Sci. Phila., IX, 1857, p. 171; * Jl. Acad. N. Sci. Phila., IV, 1859, p. 204, pl. XXIV, fig. 86; * Obs., VII, 1860, p. 22, pl. XXIV, fig. 86.—* B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *modicus* LEA, Syn., 1870, p. 40.

Chattahoochee River, Georgia.

†PLEUROBEMA STRIATA Lea.

**Unio striatus* LEA, Pr. Am. Phil. Soc., I, 1840, p. 287; * Tr. Am. Phil. Soc., VIII, 1843, p. 203, pl. XII, fig. 16; * Obs., III, 1842, p. 41, pl. XII, fig. 16.—* CONRAD, Pr. Acad. N. Sci. Phila., VI, 1853, p. 258.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 496.—* CHENU, Ill. Conch., 1858, pl. XXIX, figs. 1, 1*a*, 1*b*.—* B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *striatus* LEA, Syn., 1852, p. 26; 1870, p. 40.

Chattahoochee River, Georgia.

†PLEUROBEMA GIBBER Lea.

**Unio gibber* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 34, pl. X, fig. 30; * Obs., II, 1838, p. 35, pl. X, fig. 30.—* TROSCHEL, Arch. fur Naturg., V, 1839, Pt. 2, p. 236.—* HANLEY, Test. Moll., 1842, p. 185; * Biv. Shells, 1843, p. 185, pl. XXI, fig. 46.—* CATLOW and REEVE, Conch. Nom., 1845, p. 59.—* CONRAD, Pr. Acad. N. Sci. Phila., VI, 1853, p. 250.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* CHENU, Ill. Conch., 1858, pl. XXIII, figs. 2, 2*a*, 2*b*.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XL, fig. 219.—* B. H. WRIGHT, Check List, 1888.

**Margarita* (*Unio*) *gibber* LEA, Syn., 1836, p. 20; 1838, p. 17.

**Margaron* (*Unio*) *gibber* LEA, Syn., 1852, p. 24; 1870, p. 37.

Caney Fork, Tennessee.

†PLEUROBEMA FASSINANS Lea.

**Unio fassinans* LEA, Pr. Ac. N. Sci. Phila., XII, 1868, p. 143; * Jl. Ac. N. Sci. Phila., VI, 1869, p. 305, pl. XLVII, fig. 118; * Obs., XII, p. 65, pl. XLVII, fig. 118.—* B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *fassinans* LEA, Syn., 1870, p. 42.

†PLEUROBEMA FASSINANS var. RHOMBOIDEA Simpson.[1]

Upper Tennessee River drainage.

[1] A form of what I consider *fassinans* is abundant in the Clinch River, in western Virginia, which is considerably more rhomboid than the type and may be called var. *rhomboidea*.

†PLEUROBEMA ARGENTEA Lea.

**Unio argenteus* LEA, Pr. Am. Phil. Soc., II, 1841, p. 82; *Tr. Am. Phil. Soc.. VIII, 1843, p. 242, pl. XXV, fig. 57; *Obs., III, 1842, p. 80, pl. XXV, fig. 57.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 245.—*CHENU, Ill. Conch., 1858, pl. XXXIII, figs. 2, 2*a*, 2*b*.—H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—*KUSTER, Conch. Cab. Unio, 1861, p. 188, pl. LIX, fig. 4; 1861, p. 225, pl. LXXVI, fig. 3.—*SOWERBY, Conch. Icon., XVI, 1868, pl. XXXVII, fig. 204.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 145.

**Margaron* (*Unio*) *argenteus* LEA, Syn., 1852, p. 26; 1870, p. 40.

Upper Tennessee River drainage.

†PLEUROBEMA ARGENTEA var. PANNOSA Simpson.

**Pleurobema argentea pannosa* SIMPSON, Pr. Ac. N. Sci. Phila., 1900, p. 82.

A solid, somewhat inflated, roughened form from Hot Springs, Arkansas, may be designated as above. Probably a valid species.

†PLEUROBEMA CONASAUGÆNSIS Lea.

**Unio conasaugænsis* LEA, Pr. Ac. N. Sci. Phila., II, 1872, p. 155.—*Jl. Ac. N. Sci. Phila., VIII, 1874, p. 33, pl. X, fig. 30; *Obs., XIII, 1874, p. 37, pl. X, fig. 30.—*B. H. WRIGHT, Check List, 1888.

Upper Tennessee River drainage.

†PLEUROBEMA BREVIS Lea.

**Unio brevis* LEA, Pr. Ac. N. Sci. Phila., II, 1872, p. 157; *Jl. Ac. N. Sci. Phila., VIII, 1874, p. 35, pl. XII, fig. 32; *Obs., XIII, 1874, p. 39, pl. XII, fig. 32.—*B. H. WRIGHT, Check List, 1888.

Tennessee River system; Hardy, Arkansas.

†PLEUROBEMA BREVIS var. SUBILLIPTICA Simpson.

**Pleurobema brevis subilliptica* SIMPSON, Pr. Ac. N. Sci. Phila., 1900, p. 80.

A solid, inflated form from Hardy, Arkansas, may bear this name. It is probably a distinct species.

†PLEUROBEMA PLANIOR Lea.

**Unio planior* LEA, Pr. Ac. N. Sci. Phila., XII, 1868, p. 145; *Jl. Ac. N. Sci. Phila., VI, 1869, p. 316, pl. L, fig. 129; *Obs., XII, 1869, p. 76, pl. L, fig. 129.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *planior* LEA, Syn., 1870, p. 35.

Upper Tennessee River drainage.

†PLEUROBEMA ESTABROOKIANA Lea.

**Unio estabrookianus* LEA, Pr. Am. Phil. Soc., IV, 1845, p. 164; *Tr. Am. Phil. Soc., X, 1853, p. 77, pl. VI, fig. 17; *Obs., IV, 1848, p. 51, pl. VI, fig. 77.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 248.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *estabrookianus* LEA, Syn., 1852, p. 24; 1870, p. 35.

**Unio estabrokianus* PÆTEL, Conch. Sam., III, 1890, p. 152.

* *Unio striatissimus* ANTHONY, Am. Jl. Conch., I, p. 156, 1865, pl. XII, fig. 1.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXVI, fig. 460.—*PÆTEL, Conch. Sam., III, 1890, p. 168.

Upper Tennessee River drainage.

Section PLETHOBASUS Simpson, 1900.

(Type, *Unio æsopus* Green.)

Shell large, irregularly oval, inflated, solid, somewhat suddenly swollen at the posterior base; posterior ridge low and rounded; beaks rather high near the anterior end, having a few strong ridges which are curved upward behind; a row of low, irregular tubercles extends from near the beaks to the post basal part of the valves; epidermis tawny brown in the younger shell, becoming darker with age; hinge plate solid, not flattened; pseudocardinals triangular, rough; cavity of the beaks not deep; front part of the shell very heavy; hinder part much thinner.

Animal having the mantle somewhat toothed posteriorly; branchial and anal openings large, the latter smooth or with very faint papillæ; inner gills the larger, rounded below, free nearly or quite their whole length from the abdominal sac; marsupium occupying the entire outer gills.[1]

† PLEUROBEMA ÆSOPUS Green.

* *Unio æsopus* GREEN, Cont. Mac. Lyceum, I, No. 2, 1827, p. 46, fig. 3.—* HANLEY, Test. Moll., 1842, p. 181; * Biv. Shells, 1843, p. 181, pl. XXIV, fig. 7.—* CATLOW and REEVE, Conch. Nom., 1845, p. 551.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 496.—* CALKINS, Proc. Ottawa Acad. N. Sci., 1874, p. 41.—*CALL, Jl. Cinti. Soc. N. H., XVIII, 1896, p. 157, pl. VI.

* *Margarita* (*Unio*) *æsopus* LEA, Syn., 1836, p. 17; 1838, p. 16.

* *Margaron* (*Unio*) *æsopus* LEA, Syn., 1852, p. 23; 1870, p. 34.

* *Unio cyphia* CONRAD, New F. W. Shells, 1834, p 68.—*FERUSSAC, Guer. Mag., 1835, p. 27.

* *Unio cyphius* SAY, Am. Conch., VI, 1834.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 248.—* REEVE, Conch. Icon., XVI, 1864, pl. VIII, fig. 28.

* *Unio cyphias* var. *æsopus* PÆTEL, Conch. Sam., III, 1890, p. 150.

* *Unio scyphius* KUSTER, Conch. Cab. Unio, 1861, p. 181, pl. LVII, fig. 2.

Ohio, Cumberland, and Tennessee river systems; west to Missouri and Minnesota; Alabama River, according to Call.

[1] I am not positive as to the generic position of the two following species, but I am inclined to place them in *Pleurobema*. No other living species of this genus has any development of tubercles, but a great number of fossil forms from the Tertiary of eastern Europe which seem to be most like *Pleurobema* are decidedly pustulous. The heavy, inflated, high beaks and the comparatively shallow beak cavities are characters found in all the species of this genus. In the single gravid specimen I examined (one out of a large number from different localities) the outer gills were not filled very full of ova, though they were found throughout their extent, while the most careful search did not disclose any in the inner gills.

† PLEUROBEMA CICATRICOSA Say.

* *Unio varicosus* LEA, Tr. Am. Phil. Soc., IV, 1829, p. 90, pl. XL, fig. 20;[1] * Obs., I, 1834, p. 100, pl. XI, fig. 20.—* HANLEY, Test. Moll., 1842, p. 181; * Biv. Shells, 1843, p. 181, pl. XXI, fig. 14.—* CATLAW and REEVE, Conch. Nom., 1845, p. 65.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 496.—* CHENU, Ill. Conch., 1858, pl. XI, figs. 6, 6*a*, 6*b*.—* B. H. WRIGHT, Check List, 1888.

* *Margarita* (*Unio*) *varicosus* LEA, Syn., 1836, p. 17; 1838, p. 16.

* *Margaron* (*Unio*) *varicosus* LEA, Syn., 1852, p. 23; 1870, p. 34.

* *Unio cicatricosus* SAY, N. Harmony Diss., II, No. 19, 1829, p. 292—* SAY, Am. Conch., VI, 1834.—* FERUSSAC, Guer. Mag., 1835, p. 28.—* L. W. SAY, Terr. and Fluv. Shells, 1840, p. 5.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 246.—* KUSTER, Conch. Cab. Unio, 1861, p. 185, pl. LVIII, fig. 2.—* REEVE, Conch. Icon., XVI, 1864, pl. VIII, fig. 31; XIII, fig. 50.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 148.

* *Unio cicatricosus* var. *varicosus* PÆTEL, Conch. Sam., III, 1890, p. 148.

Ohio River; Tennessee; Claiborne, Alabama. The last locality I consider doubtful. Lea gives St. Paul, Minnesota, as a habitat, but I do not think it possibly can be.

The following species are described by Rafinesque, but I am unable to make them out.

* *Pleurobema mytiloides* RAFINESQUE, Ann. Gen. Sci. Brux., V, 1820, p. 313, pl. LXXXII, figs. 8–10.

* *Pleurobema cuneata* RAFINESQUE, Ann. Gen. Sci. Brux., V, 1820, p. 313.

TETRAGENEÆ.

Male and female shells alike, solid; beak sculpture consisting of coarse, subparallel ridges; beak cavities deep; marsupium filling all four gills, smooth, pad-like.

Genus QUADRULA (Rafinesque, 1820) Agassiz.

(Type, *Quadrula metanevra* Rafinesque.)

Quadrula RAFINESQUE, Ann. Gen. Sci. Phys. Brux., 1820, p. 305.
Rotundaria AGASSIZ, Arch. für Naturg, 1852, p. 48.
Orthonymus AGASSIZ, Arch. für Naturg, 1852, p. 48.

Shell triangular, quadrate or rhomboid, solid, inflated, with rather prominent beaks, which are generally sculptured with a few coarse, irregular, subparallel ridges that are inflated where they cross the posterior ridge; posterior ridge ordinarily well developed; base often incurved in old specimens; disks sculptured or smooth; epidermis usually dull colored, dark and rayless, or feebly rayed; hinge plate

[1] I change Lea's name because Lamarck previously applied the name *Unio varicosa* to what is, no doubt, *Alasmidonta marginata*. Mr. T. G. Lea, of Cincinnati, took many specimens of this species, the shells of which he sent to Dr. Lea, and in several of them he has written in pencil "not charged" or "ovaries charged," with the date, but neither of them seems to have described the animal. I am somewhat at a loss to know where to place this curious form. The young are much like those of *Quadrula solida*, and do not show the swellings until the third or fourth year, and occasionally the adult shell is nearly smooth.

heavy, wide, flattened; pseudocardinals solid, direct, ragged; laterals double in the left and single in the right valve, often with a small secondary lateral below the large one in the right valve; cavity of the beaks deep and compressed; dorsal scars under the hinge plate; male and female shells alike.

Animal having the inner gills the larger, generally free from the abdominal sac the greater part or all of their length; marsupium occupying all four of the gills throughout, the whole smooth and padlike.

Section CRENODONTA Schlüter.[1]

(Type, *Unio plicatus* Say.)

Shell more or less alate; beaks prominent; the surface of the valves usually sculptured with oblique folds; posterior slope generally having smaller radial plications which curve upward behind; epidermis brownish or blackish; anterior muscle scars large, distinct, very shallow, the anterior edge smooth, the rest apparently filled with roughened shelly matter; posterior scars large, shallow, indistinct; escutcheon large and dark.

Animal with the gills generally large, rounded below; inner the larger, usually free nearly or quite the entire length of the abdominal sac,[2] the two pairs united to the mantle nearly but not quite to the posterior end, having a small portion free; marsupium occupying all the four branchiæ, forming very heavy, thick pads; labial palpi usually large.

(Group of *Quadrula plicata*.)

Shell rounded to subrhomboid; plications usually strong, oblique, though in occasional specimens the surface may be perfectly plane or slightly concentrically sculptured.

[1] Schlüter applied the name *Crenodonta* (Verz. meiner Conch., 1836, p. 33) to a group of Unionidæ, the first species of which was the *Unio plicatus* of Say, but he gave no description of his group and did not designate a type. In 1853 Mörch (Yoldi catalogue, p. 45) used this name without a description or a type, and it has been applied to the plicate Uniones by von Martens (Biologia Centrali-Americana, Mollusca, 1900, p. 479).

[2] Dr. Lea found in *Quadrula multiplicata* the inner gills generally nearly or entirely free, but in certain specimens they were wholly united. My own experience in examining the animals of this species exactly coincides with his, thus showing that the character of the union of the inner gills with the abdominal sac, or their separation from it, is not a generic character, as Agassiz believed, nor is it even of specific value. Although I have examined thousands of animals belonging to the *Plicata* group of the genus *Quadrula*, taken at various seasons and throughout almost the entire range of the assemblage and of nearly all the species, I have never seen a specimen with ova or embryos in the gills save one in the alcoholic collection of Dr. Lea in the Academy of Natural Sciences at Philadelphia. Other students of the Unionidæ have found these species equally barren. It is probable that they breed only at long intervals but in enormous numbers, a supposition strengthened by the fact that Dr. Lea found about 6,000,000 young in the gills of a single *Unio multiplicatus*.

†QUADRULA PLICATA Say.

* *Unio plicata* SAY,[1] Nich. Encyc., II, 1816, pl. III, fig. 1.
* *Unio* (*Theliderma*) *plicata* SWAINSON, Tr. on Mal., 1840, p. 271, fig. 54*c*.
* *Mya plicata* EATON, Zool. Text-Book, 1826, p. 219.
* *Quadrula plicata* BAKER, Moll. Chicago, Pt. 1, 1898, pl. XXV, fig. 1.
* *Unio plicatus* HILDRETH (?), Am. Jl. Sci., XIV, 1828, p. 280.[2]—SHORT and EATON, Transylvania Jl., 1831, p. 74.—* CONRAD, New F. W. Shells, 1834, p. 71.—* SAY, Am. Conch., VI, 1834.—* FERUSSAC, Guer. Mag., 1835, p. 27.—* HANLEY, Test. Moll, 1842, p. 175; * Biv. Shells, 1843, p. 175, pl. XXI, fig. 21.—* CATLOW and REEVE, Conch. Nom., 1845, p. 63.—* KUSTER, Conch. Cab. Unio, 1856, p. 137, pl. XL, fig. 3.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 498.—* REEVE, Conch. Icon., XVI, 1864, pl. II, fig. 5.—* B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 163.
* *Margarita* (*Unio*) *plicatus* LEA, Syn., 1836, p. 12; 1838, p. 14.
* *Margaron* (*Unio*) *plicatus* LEA, Syn., 1852, p. 20; 1870, p. 30.
* *Plectomerus plicatus* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 261.
* *Unio peruviana* LAMARCK, An. sans Vert., VI, 1819, p. 71.[3]—* DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 533; 3d ed., II, 1839, p. 667.
* *Unio crassus* BARNES, Am. Jl. Sci., VI, 1823, p. 118.
* *Unio rariplicata* DESHAYES, Enc. Méth., II, 1830, p. 578; *An. sans Vert., 2d ed., VI, 1835, p. 533; 3d ed., II, 1839, p. 667.
* *Unio giganteus* LEA, Obs., II, 1838, p. 35.[4]
* *Unio heros* KUSTER, Conch. Cab. Unio, 1856, p. 136, pl. XL, figs. 1, 2.

†UNIO PLICATA var. HIPPOPÆA Lea.

* *Unio hippopæus* LEA,[5] Pr. Am. Phil. Soc., IV, 1845, p. 163; *Tr. Am. Phil. Soc., X, 1848, p. 67, pl. I, fig. 1; *Obs., IV, 1848, p. 41, pl. I, fig. 1.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* KUSTER, Conch. Cab., 1861, p. 251, pl. LXXXIV, fig. 3.—* REEVE, Conch. Icon., XVI, 1864, pl. XI, fig. 40.—* B. H. WRIGHT, Check List, 1888.
* *Margaron* (*Unio*) *hippopæus* LEA, Syn., 1852, p. 21; 1870, p. 31.
* *Unio hippopæus* PÆTEL, Conch. Sam., III, 1890, p. 155.

Upper Mississippi drainage area south to the Tennessee and Arkansas rivers; Red River of the North; Saskatchewan River; Lake Winnipeg; western Michigan. The variety in eastern Michigan and Lake Erie.

†QUADRULA PERPLICATA Conrad.

* *Unio perplicatus* CONRAD, Pr. Ac. N. Sci. Phila., I, 1841, p. 19; *Jl. Ac. N. Sci. Phila., VIII, 1842, p. 178; *I, 1850, p. 276, pl. XXXVIII, fig. 2.—*H. and A.

[1] Say says: "It was found by Mr. Lesueur in Lake Erie, and was communicated by him under the above name." As there is no evidence that Lesueur described the species, and as Say was the one to first properly characterize it, I believe that he must be credited with it.

[2] Referred to figure 5, but this with a number of other figures in this paper were left out by the editor.

[3] Lea, who examined Lamarck's types and collection, states that this is the same as Say's *plicata*.

[4] Dr. Lea does not describe this, but only states that it is in Dr. Mitchell's collection. Probably it has never been described.

[5] Apparently a stunted variety of *Quadrula plicata*. Dr. Lea's specimens show a great diversity of characters.

ADAMS, Gen. Rec. Moll., II, 1857, p. 498.—* REEVE, Conch. Icon., XVI, 1864, pl. IX, fig. 35.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 163.

**Margaron (Unio) perplicatus* LEA, Syn., 1852, p. 20; 1870, p. 29.

**Plectomerus perplicatus* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 261.

†* *Unio atrocostatus* LEA, Tr. Am. Phil. Soc., X, 1848, p. 70, pl. II, fig. 5;[1] * Obs., IV, 1848, p. 44, pl. II, fig. 5.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 145.

**Margaron (Unio) atrocostatus* LEA, Syn., 1852, p. 20; 1870, p. 29.

†* *Unio pearlensis* CONRAD, Tr. Am. Phil. Soc., VII, 1855, p. 256.[2]—* REEVE, Conch. Icon., XVI, 1864, pl. XI, fig. 42.

**Unio perlensis* PÆTEL, Conch. Sam., III, 1890, p. 163.

†* *Unio brazosensis* LEA, Pr. Ac. N. Sci. Phila., XII, 1868, p. 144;[3] * Jl. Ac. N. Sci. Phila., VI, 1869, p. 309, pl. XLVIII, fig. 122; * Obs., XII, 1869, p. 69, pl. XLVIII, fig. 122.—* B. H. WRIGHT, Check List, 1888.

**Margaron (Unio) brazosensis* LEA, Syn., 1870, p. 31.

†* *Unio lineeumii* LEA, Pr. Ac. N. Sci. Phila., XII, 1868, p. 144; * Jl. Ac. N. Sci. Phila., VI, 1869, p. 312, pl. XLIX, fig. 125; * Obs., XII, 1869, p. 72, pl. XLIX, fig. 125.—* B. H. WRIGHT, Check List, 1888.

**Margaron (Unio) lineeumii* LEA, Syn., 1870, p. 31.

**Unio lineeurii* PÆTEL, Conch. Sam., III, 1890, p. 157.[4]

†* *Unio pauciplicatus* LEA, Pr. Ac. N. Sci. Phila., II, 1872, p. 156; * Jl. Ac. N. Sci. Phila., VIII, 1874, p. 29, pl. IX, fig. 26; * Obs., XIII, 1874, p. 33, pl. IX, fig. 26.—* B. H. WRIGHT, Check List, 1888.

†QUADRULA PERPLICATA var. QUINTARDII Cragin.[5]

**Unio quintardii* CRAGIN, Bull. Washb. College, II, 1887, p. 6.—* PILSBRY, Pr. Ac. N. Sci. Phila., 1892, p. 131, pl. VII, figs. 1–3.—* B. H. WRIGHT, Check List, 1888.

Alabama River drainage and streams flowing into the Gulf of Mexico west to central Texas, north to southern Kansas.

†QUADRULA ELLIOTTII Lea.[6]

**Unio elliottii* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 262; *Jl. Ac. N. Sci. Phila., IV, 1858, p. 54, pl. VII, fig. 37; * Obs., VI, 1858, p. 54, pl. VII, fig.

[1] This seems to be merely a form of *perplicata*, with a rather rude growth and roughened epidermis.

[2] A comparatively smooth form of *perplicatus*, according to the type.

[3] Another smooth form of *perplicatus*.

[4] The above is a fair sample of Pætel's orthography throughout his work.

[5] A right valve of the type was kindly loaned to the writer by Mr. Quintard. It is a rather light brown, glossy shell, and is sculptured with a series of A-shaped markings on the disk. Otherwise it is generally like *Q. perplicatus*. I have seen the *Q. undulata* and one or two other species of this group break from the ordinary oblique bars into these peculiar markings, and I am quite sure that in this case the same thing has happened to *Q. perplicata*.

[6] Dr. Lea first called this *Unio atrocostatus*, and then wrote in one of his duplicates *Unio elliottii*. He says that it is very near to *U. perplicatus* Conrad, but that the young of his species have a yellow stain on the posterior part of the nacre not found on any other species. I have, however, found it on young *atrocostatus* in his collection. I am strongly inclined to believe that the *elliottii* is only a peculiar, vigorous variety of *perplicata*, but do not feel quite certain of it, and so let it go as a species with doubt.

37.—* Reeve, Conch. Icon., XVI, 1864, pl. v, fig. 20.—* B. H. Wright, Check List, 1888.

**Margaron* (*Unio*) *elliottii* Lea, Syn., 1870, p. 29.

Southern Georgia to Texas.

†QUADRULA UNDULATA Barnes.

**Unio undulatus* Barnes, Am. Jl. Sci., VI, 1823, p. 120, pl. II.—* Hildreth, Am. Jl. Sci., XIV, 1828, p. 279.—* Hanley, Test. Moll., 1842, p. 175; * Biv. Shells, 1843, p. 175, pl. XX, fig. 26.—* Catlow and Reeve, Conch. Nom., 1845, p. 65.—* Chenu, Bib. Conch., 1st ser., III, 1845, p. 24, pl. v, figs. 1, 1*a*.—* H. and A. Adams, Gen. Rec. Moll., II, 1857, p. 495.—* Chenu, Manual, 1859, II, p. 143, fig. 704.—* Sowerby, Conch. Icon., XVI, 1868, pl. LXXVI, fig. 399.—* Calkins, Pr. Ottawa Acad. Sci., 1874, p. 45.—* B. H. Wright, Check List, 1888.

**Margarita* (*Unio*) *undulatus* Lea, Syn., 1836, p. 12; 1838, p. 14.

**Margaron* (*Unio*) *undulatus* Lea, Syn., 1852, p. 20; 1870, p. 29.

**Mya undulata* Eaton, Zool. Text-Book, 1826, p. 219.

**Unio undulata* Valenciennes, Rec. Obs. Zool. Anat., II, 1833, p. 229, pl. LIV, figs. 3, 3*a*, 3*b*.—* Deshayes, Tr. Elem. Conch., 1839, p. 19, pl. XXX, figs. 8, 9.

**Quadrula undulata* Baker, Moll. Chicago, Pt. I, 1898, p. 82, pl. XXII, figs. 1, 2; XII, fig. 1.

**Unio costatus* Say, Am. Conch., VI, 1834.—* Conrad, New F. W. Shells, 1834, p. 68.—* Ferussac, Guer. Mag., 1835, p. 27.—* Conrad, Monog., II, 1836, p. 17, pl. VII.—* Kuster, Conch. Cab., 1852, p. 54, pl. XI, fig. 4.—* Reeve, Conch. Icon., XVI, 1864, pl. IV, fig. 16.

**Plectomerus costatus* Conrad, Pr. Acad. N. Sci. Phila., VI, 1853, p. 260.

**Unio plicatus* Kuster, Conch. Cab., 1856, p. 137, pl. XL, fig. 3.—* Chenu, Manual, 1859, II, p. 143, fig. 706.

**Unio atrocostatus* Sowerby, Conch. Icon., XVI, 1868, pl. LXXVII, fig. 404.

†QUADRULA UNDULATA var. LATECOSTATA Lea.

**Unio latecostatus* Lea, Pr. Am. Phil. Soc., IV, 1845, p. 163;[1] * Tr. Am. Phil. Soc., X, 1848, p. 68, pl. I, fig. 2; * Obs., IV, 1848, p. 42, pl. I, fig. 2.—* Kuster, Conch. Cab., 1861, p. 251, pl. LXXXIV, fig. 4.—* B. H. Wright, Check List, 1888.

**Margaron* (*Unio*) *laticostasus* Lea, Syn., 1852, p. 21.

**Margaron* (*Unio*) *laticostatus* Lea, Syn., 1870, p. 31.

**Unio laticostatus* H. and A. Adams, Gen. Rec. Moll., II, 1857, p. 497.—* Pætel, Conch. Sam., III, 1890, p. 156.

†QUADRULA UNDULATA var. PILSBRYI Marsh.

**Unio pilsbryi* Marsh, Nautilus, V, 1891, p. 1.[2]—* Pilsbry, Pr. Ac. N. Sci. Phila., 1892, p. 131, pl. VIII, figs. 7, 8; * Nautilus, VII, 1893, pl. I, figs. 7, 8.[3]

[1] More compressed and having finer, more delicate plications than the type. I have traced it northward into Kansas, where it gradually assumes the ordinary form of *undulata*. Occasional specimens are found in the Northern States which agree very well with the typical *latecostata*.

[2] I feel quite sure that this is only a peculiar variety of *undulata*.

[3] A peculiar shell belonging to Mr. J. H. Ferriss, of Joliet, Illinois, from Lake Winnipeg, has been examined by the writer. It has unusually strong growth lines and is quite full in the ventral region, and has only the very faintest vestiges of plications below the lower part of the posterior ridge. I regard it as a smooth form of *Q. undulata*, and if any considerable number of such specimens were found it might be worthy of a varietal name.

Mississippi basin generally; St. Lawrence drainage; Red River of the North; Lake Winnipeg; Alabama River system; southwest to western Texas, the varieties in the southwestern area.

QUADRULA DIGITATA Morelet.

* *Unio digitatus* MORELET, Test. Noviss., Pt. 2, 1851, p. 24.—* B. H. WRIGHT, Check List, 1888.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 563, pl. LX, fig. 1.

Rio Usumacinta, Guatemala.

† QUADRULA TRIUMPHANS B. H. Wright.

* *Unio triumphans* B. H. WRIGHT, Nautilus, XI, 1898, p. 101.
* *Quadrula triumphans* SIMPSON, Pr. Ac. N. Sci. Phila., 1900, p. 83, pl. III, fig 3.

Coosa River, St. Clair County, Alabama.

† QUADRULA BOYKINIANA Lea.

* *Unio boykinianus* LEA, Pr. Am. Phil. Soc., I, 1840, p. 288; * Tr. Am. Phil. Soc., VIII, 1842, p. 208, pl. XIII, fig. 22; * Obs., III, 1842, p. 46, pl. XIII, fig. 22.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 498.—* CHENU, Ill. Conch., 1858, pl. XXVII, figs. 2, 2*a*, 2*b*.—* KUSTER, Conch. Cab., 1861, p. 181, pl. LVII, fig. 1.—* SOWERBY, Conch. Icon., XVI, 1868, pl. I, fig. 1.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 146.
* *Margaron* (*Unio*) *boykinianus* LEA, Syn., 1852, p. 19; 1870, p. 28.
* *Plectomerus boykinianus* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 260.
* *Unio baykinianus* P.ETEL, Conch. Sam., III, 1890, p. 145.

Chattahoochee River system; Claiborne, Alabama; Pine Barren Creek, Escambia County, Florida.

† QUADRULA HEROS Say.[1]

Unio heros SAY, New Harm. Diss., II, No. 19, 1829, p. 291; * Am. Conch., VI, 1834, (part).—* CONRAD, New F. W. Shells, 1834, p. 69—* FERUSSAC, Gner. Mag., 1835, p. 27.—* CONRAD, Monog., XII, 1840, p. 107, pl. LIX.—* HANLEY, Test. Moll., 1842, p. 175; * Biv. Shells, 1843, p. 175, pl. XXII, fig. 28.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 155.
* *Unio heros* var. *multiplicatus* P.ETEL, Conch. Sam., III, 1890, p. 155.
* *Unio undulatus* SAY, Am. Conch., I, 1831, pl. XVI (April).
† * *Unio multiplicatus* LEA, Tr. Am. Phil. Soc., IV, 1831, p. 70, pl. IV, fig. 2 (latter part of the year); * Obs., I, 1834, p. 80, pl. IV, fig. 2.—* POTIEZ and MICHAUD, Gall. Moll., 1844, p. 155, pl. LIX, fig. 1.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 498.—* CHENU, Ill. Conch., 1858, pl. IX, figs. 2, 2*a*, 2*b*; * Manual, 1859, II, p. 143, fig. 703.—* CALKINS, Pr. Ottawa Acad. Sci., 1874, p. 43.—* B. H. WRIGHT, Check List, 1888.

[1] There has been some dispute as to what name should be applied to the above species. In 1829 Say fully described in the New Harmony Disseminator a species which he called *Unio heros*, but did not figure it. Later in the American Conchology he placed it in the synonymy of *Unio undulatus* Barnes, though the figure which he gives as *undulatus* in that work and to which his description refers is plainly not Barnes's species, but the *heros* described in the Disseminator. In 1831 Dr. Lea described Say's species as *Unio multiplicatus*. Notwithstanding the fact that Say placed his own species in the synonymy, it is perfectly distinct and was properly characterized in his description, and his name will have to take the place of the better known one of Dr. Lea.

† * *Margarita* (*Unio*) *multiplicatus* LEA, Syn., 1836, p. 12; 1838, p. 14.
* *Margaron* (*Unio*) *multiplicatus* LEA, Syn., 1852, p. 20; 1870, p. 29.
† * *Unio eightsii* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 306; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 367, pl. LXIV, fig. 192; * Obs., VIII, 1860, p. 49, pl. LXIV, fig. 192.—* B. H. WRIGHT, Check List, 1888.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 564.
* *Margaron* (*Unio*) *eightsii* LEA, Syn., 1870, p. 29.
* *Unio eighti* P.ETEL, Conch. Sam., III, 1890, p. 151.
* *Unio atrocostatus* REEVE, Conch. Icon., XVI, 1864, pl. IV, fig. 13. (Changed in Errata to *Unio heros*.)

Mississippi River system generally; Red River of the North; Tombigbee River, Alabama; southwest to New Leon, Mexico.

†QUADRULA NICKLINIANA Lea.

* *Unio nicklinianus* LEA, Tr. Am. Phil. Soc., V, 1834, p. 28, pl. I, fig. 1; * Obs., I, 1834, p. 140, pl. I, fig. 1.—* HANLEY, Test. Moll., 1842, p. 175; * Biv. Shells, 1843, p. 175, pl. XXI, fig. 52.—* CATLOW and REEVE, Conch. Nom., 1845, p. 61.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 498.—* SOWERBY, Conch. Icon., XVI, 1866, pl. LIII, fig. 276.—* B. H. WRIGHT, Check List, 1888.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 565.
* *Margarita* (*Unio*) *nicklinianus* LEA, Syn., 1836, p. 12; 1838, p. 14.
* *Margaron* (*Unio*) *nicklinianus* LEA, Syn., 1852, p. 19; 1870, p. 28.
* *Plectomerus nicklinianus* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 261.
* *Unio nicklianus* KUSTER, Conch. Cab., 1861, p. 218, pl. LXXIII, fig. 3.—* P.ETEL, Conch. Sam., III, 1890, p. 161.

Mexico; Guatemala.

†QUADRULA STOLLI von Martens.

† *Unio stolli* VON MARTENS, Biol. Centrali-Amer., Mollusca, 1900, p. 492, pl. XXIX, fig. 2.

Rio de las Salinas, Guatemala; Moctezuma River Central America?[1]

†QUADRULA NEISLERII Lea.

* *Unio neislerii* LEA, Pr. Ac. N. Sci. Phila., II, 1858, p. 165; * Jl. Ac. N. Sci. Phila., IV, 1859, p. 212, pl. XXVI, fig. 93; * Obs., VII, 1859, p. 30, pl. XXVI, fig. 93.—* B. H. WRIGHT, Check List, 1888.
* *Margaron* (*Unio*) *neislerii* LEA, Syn., 1870, p. 29.

Flint River and Macon, Georgia.

[1] Very close to *Quadrula nickliniana* Lea. According to von Martens in the above citation the *Unio nickliana* of Kuster (Conch. Cab. Unio, new ed., p. 218, pl. LXXIII, fig. 3) is not the *nicklinianus* of Lea, but a new species which he calls *Unio stolli*. I can not agree with him, as it seems to me that Kuster's figure represents Lea's species very well. The figure and description of *U. stolli* given by von Martens represent a more elongated and more plicate shell than the typical *nicklinianus* of Lea, but I am doubtful whether it is distinct. Lea's shells of both forms are mostly from the Moctezuma River, which is in Central America according to Lea, but the only river of that name I can find is in New Leon, Mexico. Part of von Martens' work describing the Unionidæ of Central America has been received as the Synopsis is going through the press, and for the most part too late to avail myself of the large amount of valuable information it contains.

(Group of *Quadrula trapezoides.*)

Shell rhomboid, inflated, with a high posterior ridge; beak sculpture coarse, irregular corrugations swollen to nodules on the posterior ridge; surface sculptured on posterior half with oblique ridges, which are sometimes corrugated, and with strong corrugations on post slope beak cavities only moderately deep; nacre purple.

Animal with the gills slightly rounded below, inner the larger throughout, free from the abdominal sac; palpi enormous, long; branchial opening very large, finely papillose; anal opening with fine papillæ or crenulations.

† QUADRULA TRAPEZOIDES Lea.[1]

* *Unio crassidens* var. *a*, LAMARCK, An. sans Vert., VI, 1819, p. 71.[2]

* *Plectomerus crassidens* var. *a*, CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 261.

* *Unio trapezoides* LEA, Tr. Am. Phil. Soc., IV, 1831, p. 69, pl. III, fig. 1; * Obs., I, 1834, p. 79, pl. III, fig. 1.—* CONRAD, New F. W. Shells, 1834, p. 72 —* FERUSSAC, Guer. Mag., 1835, p. 27.—* HANLEY, Test. Moll., 1842, p. 176; * Biv. Shells, 1843, p. 176, pl. XXII, fig. 29.—* CATLOW and REEVE, Conch. Nom., 1845, p. 64.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* CHENU, Ill. Conch., 1858, pl. X, figs. 2, 2*a*, 2*b*; Manual, 1859, II, p. 142, fig. 699.—* KUSTER, Conch. Cab., 1862, p. 274, pl. XCII, fig. 2.—* REEVE, Conch. Icon., XVI, 1864, pl. V, fig. 17.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL Conch. Sam., III, 1890, p. 169.

* *Margarita* (*Unio*) *trapezoides* LEA, Syn., 1836; p. 12; 1838, p. 14.

* *Margaron* (*Unio*) *trapezoides* LEA, Syn., 1852, p. 21; 1870, p. 31.

Unio interruptus SAY, Transylvania Journal, IV, 1831, p. 525; * Am. Conch., IV, 1832, pl. XXXIII, VI, 1834.—* FERUSSAC, Guer. Mag., 1835, p. 28.—* DESHAYES, An. sans. Vert., 2d ed., VI, 1835, p. 556; 3d ed., II, 1839, p. 675.—* TROSCHEL, Arch. für Naturg., V, 1839, Pt. 2, p. 234.—* CHENU, Bib. Conch., 1st ser., III, 1845, p. 45, pl. XVII, figs. 1-3.

* *Unio dombeyana* VALENCIENNES, Rec. Obs. Zool., II, 1833, p. 227, pl. LIII, figs. 1, 1*a*, 1*b*.

Streams flowing into the Gulf of Mexico, from the Alabama River west to eastern Texas; northward in the Mississippi system to northwest Tennessee.

[1] In 1820 Rafinesque applied the name *interrupta* to some, to me, unknown *Unio*, in Ann. Gen. Sci. Phys. Brux., but as he placed his species in the subgenus *Plagiola* of the genus *Obliquaria* and not in *Unio* at all, it does not have priority in the latter genus. In 1831 (December, according to Dr. Lea) Say described in the Transylvania Journal the species which Dr. Lea called *Unio trapezoides* as *Unio interruptus*. In the latter part of the same year (I am unable to ascertain the exact date) Dr. Lea published his name in the Transactions of the American Philosophical Society. As I have found it impossible to determine which name was actually published first I have used the better known—that of Dr. Lea.

[2] This is *Unio trapezoides* Lea according to Lea, who examined the Lamarckian types. See Synopsis, 4th ed., p. 37, footnote.

Section **QUADRULA** (Rafinesque, 1820) Agassiz.

(Type, *Unio cylindricus* Say.)

Shell rhomboid; surface pustulous, with a high, rounded, or sharp posterior ridge; epidermis generally smooth and bright.

(Group of *Quadrula metanevra*.)

Shell quadrate or rhomboid, with a wide, rounded posterior ridge, above which, on the posterior slope is a decided radial furrow; whole surface except the anterior end generally pustulous, the sculpture of the posterior slope being often wrinkled; umbonal region high; epidermis shining, usually painted with a beautiful pattern of triangular spots, and sometimes chevron-shaped lines; hinge strong, the secondary lateral in right valve rather feeble, but there is often a faint third lateral above; cavity of the beaks deep and compressed.

Animal with the marsupium filling all four leaves of the branchiæ, the ova giving it a purplish tint; inner gills free from the abdominal sac for the greater part of their length; mantle bordered with black; branchial opening opposite the lobe of the shell, extending well on to its base; anal opening without papillæ.

†QUADRULA CYLINDRICA Say.

* *Unio cylindricus* SAY, Nich. Encyc., II, 1816, pl. IV, fig. 3.—* HILDRETH, Am. Jl. Sci., XIV, 1828, p. 283, figs. 13, 13*b*.—* SHORT and EATON, Transylvania Jl., 1831, p. 76.—* SAY, Am. Conch., VI, 1834.—* CONRAD, New F. W. Shells, 1834, p. 68.—* FERUSSAC, Guer. Mag., 1835, p. 27.—* HANLEY, Test. Moll., 1842, p. 182; * Biv. Shells, 1843, p. 182, pl. XX, fig. 31.—* CATLOW and REEVE, Conch. Nom., 1845, p. 58.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 248.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 496.—* KUSTER, Conch. Cab. Unio, 1861, p. 194, pl. LXII, figs. 1, 2.—* SOWERBY, Conch. Icon., XVI, 1867, pl. LX, fig. 300.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 150.—* CALL. Tr. Acad. Sci. St. Louis, VII, 1895, p. 15, pl. XII.

* *Margarita* (*Unio*) *cylindricus* LEA, Syn., 1836, p. 17; 1838, p. 16.

* *Margaron* (*Unio*) *cylindricus* LEA, Syn., 1852, p. 23; 1870, p. 35.

* *Orthonymus cylindricus* AGASSIZ, Arch. für. Naturg., I, 1852, p. 48.

* *Mya cylindrica* EATON, Zool. Text-Book, 1826, p. 219.

* *Unio* (*Theliderma*) *cylindrica* SWAINSON, Treat. on Mal., 1840, p. 271, fig. 54*c*.

* *Unio* (*Eurynia*) *solenoides* var. *cylindrica* RAFINESQUE, Ann. Gen. Sci. Phys. Brux., V, 1820, p. 298.

* *Unio naviformis* LAMARCK, An. sans Vert., VI, 1819, p. 75.—* DESHAYES, Encyc. Méth., II, 1830, p. 580.—* VALENCIENNES, Rec. Obs. Zool., II, 1833, p. 233, pl. LIII, fig. 4.—* DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 537; 3d ed., II, 1839, p. 669.—* ANTON, Verz. der. Conch., 1839, p. 14.—* REEVE, Conch. Syst., 1841, p. 118, pl. LXXXIX, fig. 7.[1]

* *Unio rugosus* CHENU, Man., 1859, II, p. 138, fig. 668.

Entire Ohio, Cumberland, and Tennessee river systems; west to Nebraska (Aughey, doubtful); south to Arkansas and Indian Territory.

[1] Mr. B. H. Wright, Nautilus, XII, 1898, p. 6, has made a var. *strigillatus* of a compressed, very rough form of *cylindrica*. There seems to me to be an absolute gradation from cylindrical, nearly smooth specimens to this form.

†QUADRULA METANEVRA Rafinesque.

* *Obliquaria* (*Quadrula*) *metanevra* RAFINESQUE, Ann. Gen. Sci. Brux., V, 1820, p. 305, pl. LXXXI, figs. 15, 16.[1]—* CHENU, Bib. Conch., 1st ser., III, 1845, p. 18, pl. II, figs. 15, 16.

* *Unio* (*Theliderma*) *metanevra* SWAINSON, Treat. on Mal., 1840, p. 268, figs. 50, 54*b*.

* *Unio metanever* SHORT and EATON, Transylvania Jl., 1831, p. 76.—* CONRAD, New F. W. Shells, 1834, p. 70.—* HANLEY, Test. Moll., 1842, p. 179; * Biv. Shells, 1843, p. 179, pl. XXI, fig. 31.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 252.—* REEVE, Conch. Icon., XVI, 1864, pl. VII, fig. 25.—* PÆTEL, Conch. Sam., III, 1890, p. 159.

* *Margarita* (*Unio*) *metanever* LEA, Syn., 1836, p. 15; 1838, p. 15.

* *Unio metanevrus* SAY, Am. Conch., VI, 1834.—* FERUSSAC, Guer. Mag., 1835, p. 27.—* CONRAD, Monog., I, 1835, p. 10, pl. V, fig. 2.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* CALKINS, Pr. Ottawa Ac. N. Sci., 1874, p. 43.—* B. H. WRIGHT, Check List, 1888.—CALL, Tr. Acad. N. Sci. St. Louis, VII, 1895, p. 28, pl. X.

* *Margaron* (*Unio*) *metanevrus* LEA, Syn., 1852, p. 22; 1870, p. 33.

* *Unio metaniver* CATLOW and REEVE, Conch. Nom., 1845, p. 61.

* *Unio metaneurus* KUSTER, Conch. Cab. Unio, 1852, p. 50, pl. X, fig. 4.—* PÆTEL, Conch. Sam., III, 1890, p. 159.

*? *Unio nodosus* BARNES, Am. Jl. Sci. VI, 1823, p. 124, pl. VI, figs. 7, 7*a*, 7*b*.[2]—* HILDRETH, Am. Jl. Sci., XIV, 1828, p. 281.—* CHENU, Manual, 1859, II, p. 138, fig. 663.

* *Mya nodosa* EATON, Zool. Text-Book, 1826, p. 216.

†QUADRULA METANEVRA var. WARDII Lea.

* *Unio wardii* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 392; * Jl. Ac. N. Sci. Phila., V, 1862, p. 187, pl. XXIV, fig. 257; * Obs., IX, 1863, p. 9, pl. XXIV, fig. 257.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXII, fig. 434.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 172.

* *Margaron* (*Unio*) *wardii* LEA, Syn., 1870, p. 33.

Mississippi drainage area except its southern portion, extending to the Tennessee and Arkansas rivers.

†QUADRULA TUBEROSA Lea.

* *Unio tuberosus* LEA, Pr. Am. Phil. Soc., I, 1840, p. 286; * Tr. Am. Phil. Soc., VIII, 1842, p. 210, pl. XIV, fig. 25; * Obs., III, 1842, p. 48, pl. XIV, fig. 25.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 258.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* CHENU, Ill. Conch., 1858, pl. XXVIII, figs. 7, 7*a*, 7*b*.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 170.

* *Margaron Unio tuberosus* LEA, Syn., 1852, p. 22; 1870, p. 33.

Cumberland and Tennessee river systems.

[1] By common consent this species—which is a most striking one—has been allowed to stand to the credit of Rafinesque. The outlines of the figures bear some resemblance to the species.

[2] It is hard to tell from these figures just what Barnes had before him when he described this species. They are as much like *metanevra* as anything.

†QUADRULA SPARSA Lea.

* *Unio sparsus* LEA, Pr. Am. Phil. Soc., II, 1841, p. 82;[1] * Tr. Am. Phil. Soc., VIII, 1842, p. 242, pl. XXV, fig. 58; * Obs., III, 1842, p. 80, pl. XXV, fig. 58.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 257.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* CHENU, Ill. Conch., 1858, pl. XXVI, figs. 2, 2*a*, 2*b*.—* REEVE, Conch. Icon., XVI, 1864, pl. IV, fig. 14.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 168.

* *Margaron* (*Unio*) *sparsus* LEA, Syn., 1852, p. 22; 1870, p. 33.

Holston and Clinch rivers, Tennessee.

†QUADRULA INTERMEDIA Conrad.

* *Unio intermedius* CONRAD, Monog., VII, 1836, p. 63, pl. XXXV, fig. 2; *Pr. Ac. N. Sci. Phil., VI, 1853, p. 250.—* HANLEY, Biv. Shells, 1856, p. 381, pl. XX, fig. 28.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* KUSTER, Conch. Cab. Unio, 1861, p. 213, pl. LXX, fig. 6.—* REEVE, Conch. Icon., XVI, 1864, pl. XIII, fig. 48.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 155.

* *Margaron* (*Unio*) *intermedius* LEA, Syn., 1852, p. 22; 1870, p. 33.

* *Unio kleinianus* KUSTER, Conch. Cab. Unio, 1861, p. 191, pl. LX, fig. 4.

Tennessee River system.

†QUADRULA STAPES Lea.

* *Unio stapes* LEA, Tr. Am. Phil. Soc., IV, 1831, p. 77, pl. VII, fig. 8.—* Obs., I. 1834, p. 87, pl. VII, fig. 8.—* CONRAD, New F. W. Shells, 1834, p. 71.—* FERUSSAC, Guer. Mag., 1835, p. 28.—* CONRAD, Monog., VII, 1836, p. 62, pl. XXXV, fig. 1.—* HANLEY, Test. Moll., 1842, p. 179; * Biv. Shells, 1843, p. 179, pl. XXII, fig. 38.—* CATLOW and REEVE, Conch. Nom., 1845, p. 64.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 258.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—CHENU, Ill. Conch., 1858, pl. XV., figs. 5, 5*a*, 5*b*; * Manual, 1859, II, p. 142, fig. 997.—* REEVE, Conch. Icon., XVI, 1864, pl. XIII, fig. 52.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 168.

* *Margarita* (*Unio*) *stapes* LEA, Syn., 1836, p. 15; 1838, p. 13.

* *Margaron* (*Unio*) *stapes* LEA, Syn., 1852, p. 22; 1870, p. 33.

* *Unio retusus* SAY, Am. Conch., VI, 1834.

* *Unio stegarius* KUSTER, Conch. Cab. Unio, 1861, p. 211, pl. LXX, fig. 3.

Alabama and Tombigbee rivers.

Section **THELIDERMA** (Swainson, 1840) Simpson.[2]

(Type, *Unio lachrymosus* Lea.)

Shell rounded, quadrate to rhomboid, solid, pustulous; beaks rather prominent; beak sculpture consisting of a few rather coarse, subparallel ridges; anterior end rounded or slightly subtruncate above; base often arcuate; posterior end truncate, high and angled behind the ligament; epidermis scarcely rayed, never pointed; beak cavities rather deep.

[1] It is likely that this is only a small, rather smooth variety of *tuberosus*.

[2] Swainson's first species of this group in the text of the Treatise is *Unio irroratus*, and after this *metanevrus* and *cylindricus*. In the final classification in the same work he includes in the group *lachrymosus* and *pustulosus*, and by the process of elimination I use the name in order to save coining a new one.

(Group of *Quadrula lachrymosa.*)

Shell quadrate or rhomboid, generally with a sharp, well-developed posterior ridge, in front of which is a wide, shallow, radial excavation; base incurved, posterior end sharply truncate, generally slightly biangular below, high and distinctly angled behind the ligament; posterior tubercles often in somewhat radiating rows; earlier beak sculpture consisting of ridges nearly parallel with the growth lines, but later on becoming doubly looped and blending into the general sculpture of the shell; epidermis smooth; pseudocardinals strong; laterals straight; nacre white.

Animal with all four gills used as a marsupium throughout, inner much the larger, free from the abdominal sac nearly or quite their whole length; palpi very large; branchial opening generally having clustered, often branching papillæ; anal opening smooth; superanal opening closed below.

†QUADRULA ASPER Lea.

* *Unio asper* LEA, Tr. Am. Phil. Soc., IV, 1831, p. 85, pl. IX, fig. 15; * Obs., I, 1834, p. 95, pl. IX, fig. 15.—* CONRAD, New F. W. Shells, 1834, p. 67.—* HANLEY, Test. Moll., 1842, p. 179; * Biv. Shells, 1843, p. 179, pl. XXII, fig. 37.—* CATLOW and REEVE, Conch. Nom., 1845, p. 56.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 245.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* CHENU, Ill. Conch., 1858, pl. XV, figs. 4, 4*a*, 4*b*; * Manual, 1859, II, p. 142, fig. 695.—* REEVE, Conch. Icon., XVI, 1864, pl. V, fig. 18.—* B. H. WRIGHT, Check List, 1888.

* *Margarita* (*Unio*) *asper* LEA, Syn., 1836, p. 15; 1838, p. 15.

* *Margaron* (*Unio*) *asper* LEA, Syn., 1852, p. 22; 1870, p. 33.

* *Unio nobilis* CONRAD, Jl. Ac. N. Sci. Phila., II, 1854, p. 297, pl. XXVII, figs. 2, 3.

* *Unio turgidus* REEVE, Conch. Icon., XVI, 1864, pl. III, fig. 10.

* *Unio apiculatus* var. *asper* PÆTEL, Conch. Sam., III, 1890, p. 144.

Streams flowing into the Gulf of Mexico from Alabama west to central Texas, and northward to the Verdigris River, Kansas.

†QUADRULA LACHRYMOSA Lea.

Unio lachrymosus LEA, Tr. Am. Phil. Soc., III, 1828, p. 272, pl. VI, fig. 8;[1] Obs., I, 1834, p. 14, pl. VI, fig. 8.—* SHORT and EATON, Transylvania Jl., 1831, p. 76.—* FERUSSAC, Guer. Mag., 1835, p. 27.—* HANLEY, Test. Moll., 1842, p. 177; * Biv. Shells, 1843, p. 177, pl. XX, fig. 38.—* CATLOW and REEVE, Conch. Nom., 1845, p. 60.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* CHENU, Ill. Conch., 1858, pl. XV, figs. 6, 6*a*, 6*b*; Manual, 1849, II, p. 142, fig. 698.—* REEVE, Conch. Icon., XVI, 1864, pl. IX, fig. 33.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 156.

* *Margarita* (*Unio*) *lachrymosus* LEA, Syn., 1836, p. 14; 1838, p. 15.

* *Margaron* (*Unio*) *lachrymosus* LEA, Syn., 1852, p. 21; 1870, p. 32.

* *Unio lachrymosus* KUSTER, Conch. Cab., 1854, p. 70, pl. XVII, fig. 3.

[1] Published as a separate in 1827. I have not seen this. Title from Sabin's Bibliotheca America.

* *Quadrula lachrymosa* BAKER, Moll. Chicago, Pt. I, 1898, p. 83, pl. XXV, fig. 1; XII, fig. 2.

† * *Unio asperrimus* LEA, Tr. Am. Phil. Soc., IV, 1831, p. 71, pl. V, fig. 3;[1] * Obs., I, 1834, p. 81, pl. V, fig. 3.—* HANLEY, Test. Moll., 1842, p. 178; * Biv. Shells, 1843, p. 178, pl. XXI, fig. 12.—* POTIEZ and MICHAUD, Gall. Moll., 1844, p. 156, pl. LIX, figs. 2, 3.—* CATLOW and REEVE, Conch. Nom., 1845, p. 56.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* CHENU, Ill. Conch., 1858, pl. IX, figs. 1, 1*a*, 1*b*.—* B. H. WRIGHT, Check List, 1888.

* *Margarita* (*Unio*) *asperrimus* LEA, Syn., 1836, p. 14; 1838, p. 15.

* *Margaron* (*Unio*) *asperrimus* LEA, Syn., 1852, p. 21; 1870, p. 33.

* *Unio quadrulus* SAY, Am. Conch., VI, 1834.—* CONRAD, New F. W. Shells, 1834, p. 71.—* FERUSSAC, Guer. Mag., 1835, p. 27.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 256.—* KUSTER, Conch. Cab. Unio, 1861, p. 184, pl. LVIII, fig. 1.

* *Unio quadratus* REEVE, Conch. Icon., XVI, 1864, pl. VI, fig. 24.

†QUADRULA LACHRYMOSA var. LUNULATA Pratt.

* *Unio lunulatus* PRATT, Proc. Dav. Acad. Nat. Sci., I, 1876, p. 167, pl. XXXI, fig. 1.[2]

Entire Mississippi River drainage; various localities in the St. Lawrence basin; Red River of the North; southwest into eastern Texas.

†QUADRULA COUCHIANA Lea.

* *Unio couchianus* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 305; Jl. Ac. N. Sci. Phila., IV, 1860, p. 371, pl. LXVI, fig. 196; * Obs., VIII, 1860, p. 53, pl. LXVI, fig. 196.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXI, fig. 429.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 149.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 566.—* SIMPSON, Proc. U. S. Nat. Mus., XIX, 1896, p. 370.

* *Margaron* (*Unio*) *couchianus* LEA, Syn., 1870, p. 54.

Rio Salado, Mexico; southwestern Texas.

†QUADRULA FRAGOSA Conrad.

* *Unio fragosus* CONRAD, Monog., II, 1836, p. 12, pl. VI, fig. 2; * Pr. Ac. N. Sci. Phila., VI, 1853, p. 249.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* KUSTER, Conch. Cab. Unio., 1861, p. 173, pl. LV, fig. 1.—* REEVE, Conch. Icon., XVI, 1864, pl. I, fig. 2; VII, fig. 27.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 153.

* *Margarita* (*Unio*) *fragosus* LEA, Syn., 1836, p. 14; 1838, p. 15.

* *Margaron* (*Unio*) *fragosus* LEA, Syn., 1852, p. 22; 1870, p. 33.

* *Unio fragosa* CATLOW and REEVE, Conch. Nom., 1845, p. 59.

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[1] Dr. Lea separated this from his *lachrymosus* because the latter had tearlike nodules, while those of *asperrimus* were simply elevated. The two forms absolutely run together, and specimens may be found in which both varieties of nodules occur. There are forms which are almost smooth, and there is great diversity in the matter of inflation. Dr. Lea finally came to doubt whether the *asperrimus* was valid.

[2] I think that this is a solid, inflated variety of *lachrymosus*. From the figure, Pratt's specimens seem to have few tubercles; but I have seen quite a number of shells from the Ohio River north to Minnesota which resemble it in shape, but are strongly pustulous throughout. I was at first inclined to believe these were varieties of *asper*, but I now regard them as a form of *lachrymosus*, and they may perhaps be referred to Pratt's variety. He describes his species as having a large lunule, but individuals vary greatly in this character.

* *Unio tragosus* HANLEY, Test. Moll., 1842, p. 178; * Biv. Shells, 1843, p. 178, pl. XX, fig. 40.[1]—* CATLOW and REEVE, Conch. Nom., 1845, p. 64.

Ohio, Cumberland, and Tennessee river systems; westward probably to Minnesota, Nebraska, and Kansas.

† QUADRULA FORSHEYI Lea.

* *Unio forsheyi* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 155; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 357, pl. LX, fig. 182; * Obs., VIII, 1860, p. 39, pl. LX, fig. 182.—* REEVE, Conch. Icon., XVI, 1864, pl. VI, fig. 21.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 153.

* *Margaron* (*Unio*) *forsheyi* LEA, Syn., 1870, p. 32.

Alabama to Texas, in streams flowing into the Gulf of Mexico.

† QUADRULA SPECIOSA Lea.

* *Unio speciosus* LEA, Pr. Ac. N. Sci. Phila., VI, 1862, p. 168; * Jl. Ac. N. Sci. Phila., V, 1862, p. 207, pl. XXXI, fig. 276; * Obs., IX, 1863, p. 29, pl. XXXI, fig. 276.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXIV, fig. 447.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 168.

* *Margaron* (*Unio*) *speciosus* LEA, Syn., 1870, p. 33.

Kansas, south to Texas.

† QUADRULA APICULATA Say.

* *Unio apiculatus* SAY, New Harm. Diss., II, No. 2, 1829, p. 309; * Am. Conch., VI, 1834, pl. LII.[2]—* CONRAD, New F. W. Shells, 1834, p. 67.—* FERUSSAC, Guer. Mag., 1835, p. 27.—* CONRAD, Monog., IX, 1837, p. 78, pl. XLIV, fig. 1.—* HANLEY, Test. Moll., 1842, p. 178; * Biv. Shells, 1843, p. 178, pl. XXIII, fig. 51.—* CATLOW and REEVE, Conch. Nom., 1845, p. 55.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 245.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* CHENU, Manual, 1859, II, p. 142, fig. 696.—* REEVE, Conch. Icon., XVI, 1864, pl. III, fig. 11.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 144.

* *Margarita* (*Unio*) *apiculatus* LEA, Syn., 1836, p. 15; 1838, p. 15.

* *Margaron* (*Unio*) *apiculatus* LEA, Syn., 1852, p. 22; 1870, p. 33.

* *Unio nobilis* CONRAD (part), Jl. Ac. N. Sci. Phila., 1854, p. 297, pl. XXVII, figs. 2, 3.[3]

Louisiana to Texas.

† QUADRULA RUMPHIANA Lea.

* *Unio rumphianus* LEA, Tr. Am. Phil. Soc., X, 1852, p. 276, pl. XXII, fig. 34; Obs., V, 1852, p. 32, pl. XXII, fig. 34.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 257.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 166.

* *Margaron* (*Unio*) *rumphianus* LEA, Syn., 1852, p. 21; 1870, p. 33.

† * *Unio blandianus* LEA,[4] Pr. Ac. N. Sci. Phila., VIII, 1856, p. 263; * Jl. Ac. N. Sci.

[1] Written *tragosus* in text, no doubt a typographical error, as it is written correctly in the explanation of the plate.

[2] Say says that *U. asper* Lea is the same as his *apiculatus*. I think he is wrong.

[3] One specimen figured (fig. 2) is *Q. apiculata*. The other (fig. 3) is a nondescript, possibly *Q. asper*, or it may be the form of *Q. lachrymosus* which I have placed under var. *lunulatus* Pratt.

[4] Certain forms of *rumphianus* are very different from *blandianus*, being more inflated, and showing a high, biangulate posterior ridge and a deep radial sinus in front of it, while specimens of the latter are much less inflated and have a low, somewhat rounded, posterior ridge. But the difference between the two seems to be absolutely briged by intermediate specimens.

Phila., IV, 1858, p. 65, pl. XI, fig. 47; * Obs., VI, 1858, p. 65, pl. XI, fig. 47.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXVIII, fig. 405.—* B. H. WRIGHT, Check List, 1888.—* P.ETEL, Conch. Sam., III, 1890, p. 46.

* *Margaron* (*Unio*) *blandianus* LEA, Syn., 1870, p. 33.

Western Georgia; Alabama in the Gulf drainage.

(Group of *Quadrula pustulosa*.)

Shell round quadrate, truncated behind, full and angled back of the ligament; beaks high; beak sculpture a few coarse ridges which are swollen at the somewhat rounded posterior ridge; surface generally more or less pustulous but sometimes entirely smooth and in some cases slightly corrugated; epidermis often having a broad, faint, green ray; hinge strong; nacre white or purple.

Animal with the marsupium occupying all four gills throughout; inner gills the larger, free the whole or the greater part of their length from the abdominal sac; branchial opening having clustered, often branching, papillæ.

† QUADRULA PUSTULOSA Lea.

* *Unio pustulosus* LEA, Tr. Am. Phil. Soc., IV, 1831, p. 76, pl. VII, fig. 7; * Obs., I, 1834, p. 86, pl. VII, fig. 7.—* FERUSSAC, Guer. Mag., 1835, p. 28.—* HANLEY, Test. Moll., 1842, p. 180; * Biv. Shells, 1843, p. 180, pl. XXI, fig. 34.—* CATLOW and REEVE, Conch. Nom., 1845, p. 63.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 496.—* CHENU, Ill. Conch., 1858, pl. XXIII, figs. 2, 2*a*, 2*b*.—* CALKINS, Pr. Ottawa Acad. N. Sci., 1874, p. 44.—* B. H. WRIGHT, Check List, 1888.

* *Margarita* (*Unio*) *pustulosus* LEA, Syn., 1836, p. 15; 1838, p. 15.

* *Margaron* (*Unio*) *pustulosus* LEA, Syn., 1852, p. 22; 1870, p. 33.

* *Quadrula pustulosa* BAKER, Moll. Chicago, Pt. 1, 1898, p. 86, pl. XXV, fig. 2; XXVIII, fig. 13.

* *Unio verrucosa* VALENCIENNES, Rec. Obs. Zool. Anat., II, 1833, p. 231, pl. LIII, fig. 2.

* *Unio nodulosus* SAY, Am. Conch., VI, 1834.

* *Unio prasinus* CONRAD,[1] New F. W. Shells, 1834, p. 44, pl. III, fig. 1, p. 71.—* FERUSSAC, Guer. Mag., 1835, p. 29.—* MÖLLER, Syn. Nov. Gen., 1836, p. 208.—* CONRAD, Monog., IX, 1837, p. 79, pl. XLIV, fig. 2.—* CHENU, Bib. Conch., 1st ser., III, 1845, p. 22, pl. III, fig. 1.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 255.—* REEVE, Conch. Icon., XVI, 1864, pl. VII, figs. 26, 26*a*, 26*b*.—* B. H. WRIGHT, Check List, 1888.

* *Unio bullatus* var. *prasinus* P.ETEL, Conch. Sam., III, 1890, p. 146.

* *Unio bullatus* CONRAD, New F. W. Shells, 1834, p. 68; Monog., X, 1838, p. 82, pl. XLV, fig. 2.—* KUSTER, Conch. Cab. Unio, 1852, p. 47, pl. IX, fig. 3.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 245.—* REEVE, Conch. Icon., XVI, 1864, pl. XII, fig. 43.—* P.ETEL, Conch. Sam., III, 1890, p. 146.

* *Unio dorfeuillianus* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 73, pl. XVII, fig. 54; * Obs., II, 1838, p. 73, pl. XVII, fig. 54.—* TROSCHEL, Arch. für Naturg., V, 1839, II, p. 237.—* HANLEY, Test. Moll., 1842, p. 179; * Biv. Shells, 1843, p. 179, pl. XXIII, fig. 10.—* CATLOW and REEVE, Conch. Nom., 1845, p. 58.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 248.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—*CHENU, Ill. Conch., 1858, pl. XXV, figs. 5, 5*a*, 5*b*.—* REEVE, Conch. Icon., XVI, 1864, pl. X, fig. 38.—* B. H. WRIGHT, Check List,

[1] A smooth form of *pustulosus*, according to the type in Philadelphia Academy.

1888.—* CALL (part), Tr. Ac. N. Sci. St. Louis, VII, 1895, p. 40, pls. XII, XIII, XIV, XV, figs. 1, 2.

**Margarita* (*Unio*) *dorfeuillianus* LEA, Syn., 1838, p. 15.

**Margaron* (*Unio*) *dorfeuillianus* LEA, Syn., 1852, p. 22; 1870, p. 33.

*?*Unio uber* CONRAD, Am. Jl. Conch., II, 1866, p. 279, pl. XV, fig. 16.[1]

†**Unio schoolcraftensis* LEA, Tr. Am. Phil. Soc., V, 1834, p. 37, pl. III, fig. 9;[2] *Obs., I, 1834, p. 149, pl. III, fig. 9.—*FERUSSAC, Guer. Mag., 1835, p. 29.—*HANLEY, Test. Moll., 1842, p. 178; *Biv. Shells, 1843, p. 178.—*CATLOW and REEVE, Conch. Nom., 1845, p. 63.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—*SOWERBY, Conch. Icon., XVI, 1868, pl. I, fig. 3; XIII, fig. 47.

**Margarita* (*Unio*) *schoolcraftensis* LEA, Syn., 1836, p. 15; 1838, p. 15.

**Margaron* (*Unio*) *schoolcraftensis* LEA, Syn., 1852, p. 22.

**Unio bullatus* var. *schoolcraftensis* PÆTEL, Conch. Sam., III, 1890, p. 146.

**Margaron* (*Unio*) *schoolcraftii* LEA, Syn., 1870, p. 33.

**Unio schoolcraftii*, B. H. WRIGHT, Check List, 1888.

†QUADRULA PUSTULOSA var. PERNODOSA Lea.

**Unio pernodosus* LEA, Pr. Am. Phil. Soc., IV, 1845, p. 163; *Tr. Am. Phil. Soc., X, 1848, p. 71, pl. III, fig. 8; *Obs., IV, 1848, p. 45, pl. III, fig. 8.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 254.—*REEVE, Conch. Icon., XVI, 1864, pl. XII, fig. 46.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 163.

**Margaron* (*Unio*) *pernodosus* LEA, Syn., 1870, p. 34.

†**Unio asperatus* LEA,[3] Pr. Ac. N. Sci. Phila., V, 1861, p. 41; *Jl. Ac. N. Sci. Phila., V, 1862, p. 68, pl. VII, fig. 218; *Obs., VIII, 1862, p. 72, pl. VII, fig. 218.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXV, fig. 450.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 145.

**Margaron* (*Unio*) *asperatus* LEA, Syn., 1870, p. 33.

†QUADRULA PUSTULOSA var. KEINERIANA Lea.

**Unio keinerianus* LEA, Pr. Am. Phil. Soc., V, 1852, p. 251; *Tr. Am. Phil. Soc., X, 1852, p. 281, pl. XXIII, fig. 40; *Obs., V, 1852, p. 37, pl. XXIII, fig. 40.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 251.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 496.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 156.

**Margaron* (*Unio* (*keinerianus* LEA, Syn., 1852, p. 22; 1870, p. 34.

Entire Mississippi drainage; Michigan; Lake Erie;? Alabama River system; westward to central Texas; the varieties in streams draining into the Gulf of Mexico.

[1] Probably a smooth form of *pustulosus*.

[2] The type is a nearly smooth, compressed form of *pustulosus*, I am sure. Lea includes with it in his collection a number of strongly pustulous, compressed shells. *Quadrula pustulosa* is a very widespread, abundant, and variable species. A large, solid, inflated, and somewhat quadrate form has been called *Unio dorfeuillianus* by Dr. Lea, and various smooth races have received names, but they so completely blend into the typical form that it does not seem to me they are worthy of varietal names. A somewhat triangular variety, often having a broad, faint ray, is found in the Ohio River and southward which probably equals the variety *pernodosa*.

[3] Seems to be about the same as *U. pernodosus*, only a little smoother. These two are more rounded posteriorly, and are doubtfully worthy of a varietal name.

†QUADRULA COOPERIANA Lea.

†*Unio cooperianus* LEA, Tr. Am. Phil. Soc., V, 1834, p. 61, pl. VIII, fig. 21; *Obs., I, 1834, p. 173, pl. VIII, fig. 21.—* HANLEY, Test. Moll., 1842, p. 180; * Biv. Shells, 1843, p. 180, pl. XXI, fig. 1.—* CATLOW and REEVE, Conch Nom., 1845, p. 57.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 247.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 496.—* KUSTER, Conch. Cab. Unio, 1861, p. 183, pl. LVII, fig. 5.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 149.

* *Margarita* (*Unio*) *cooperianus* LEA, Syn., 1836, p. 16; 1838, p. 15.

* *Margaron* (*Unio*) *cooperianus* LEA, Syn., 1852, p. 22; 1870, p. 34.

* *Unio striatus* REEVE, Conch. Icon., XVI, 1864, pl. VIII, fig. 30.[1]

Ohio, Cumberland, and Tennessee river systems. Reported by Keyes at Muscatine, Iowa, but this is probably an error.

†QUADRULA MORTONI Conrad.

* *Unio mortoni* CONRAD, Monog. II, 1836, p. 11, pl. VI, fig. 1.—* KUSTER, Conch. Cab. Unio, 1852, p. 51, pl. XI, fig. 1.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 252.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 160.

†* *Unio turgidus* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 11, pl. V, fig. 11; * Obs., II, 1838, p. 11, pl. V, fig. 11.—* TROSCHEL, Arch. für Naturg., V, 1839, Pt. 2, p. 234.—* HANLEY, Test. Moll., 1842, p. 180; * Biv. Shells, 1843, p. 180, pl. XXI, fig. 51.—* CATLOW and REEVE, Conch. Nom., 1845, p. 65.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 496.—* CHENU, Ill. Conch., 1858, pl. XXV, figs. 1, 1*a*, 1*b*.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 170.

* *Margarita* (*Unio*) *turgidus* LEA, Syn., 1836, p. 16; 1838, p. 15.

* *Margaron* (*Unio*) *turgidus* LEA, Syn., 1852, p. 22; 1870, p. 34.

Lower Mississippi River drainage as far north as western Tennessee and Indian Territory; west into eastern Texas.

†QUADRULA SPHÆRICA Lea.

* *Unio sphæricus* LEA, Pr. Ac. N. Sci. Phila., XII, 1868, p. 145; * Jl. Ac. N. Sci. Phila., 1869, p. 319, pl. LI, fig. 132; * Obs., XII, 1869, p. 78, pl. LI, fig. 131.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 168.

* *Margaron* (*Unio*) *sphæricus* LEA, Syn., 1870, p. 33.

Streams of Alabama and Mississippi flowing into the Gulf of Mexico.

†QUADRULA PUSTULATA Lea.

* *Unio pustulatus* LEA, Tr. Am. Phil. Soc., 1834, p. 79, pl. VII, fig. 9; * Obs., I, 1834, p. 89, pl. VII, fig. 9.—* HANLEY, Test. Moll., 1842, p. 178; * Biv. Shells, 1843, p. 178, pl. XXII, fig. 36.—* CATLOW and REEVE, Conch. Nom., 1845, p. 63.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 253.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* CHENU, Ill. Conch., 1858, pl. XV, figs. 8, 8*a*, 8*b*.—* CALKINS, Pr. Ottawa Ac. N. Sci., 1874, p. 44.—* B. H. WRIGHT, Check List, 1888.

* *Margarita* (*Unio*) *pustulatus* LEA, Syn., 1836, p. 15; 1838, p. 15.

* *Margaron* (*Unio*) *pustulatus* LEA, Syn., 1852, p. 22; 1870, p. 33.

[1] Changed in errata to *cooperianus*.

* *Unio (Theliderma) pustulata* SWAINSON, Treat. on Mal., 1840, p. 271, fig. 54*d*.
* *Unio nodulatus* SAY, Am. Conch., VI, 1834.—* CONRAD, New F. W. Shells, 1834, p. 70.—* FERUSSAC, Guer. Mag., 1835, p. 28.—* CONRAD, Monog., 1837, p. 80, pl. XLV, fig. 1.—* KUSTER, Conch. Cab., 1861, p. 254, pl. LXXXVI, fig. 1.—* REEVE, Conch. Icon., XVI, 1864, pl. XIII, fig. 51.
* *Unio nodulatus* RAFINESQUE var. *pustulatus* PÆTEL, Conch. Sam., III, 1890, p. 161.

Ohio, Cumberland, and Tennessee river systems; Mississippi River and tributaries from eastern Iowa south to Louisiana; southern Michigan.

†QUADRULA NODIFERA Conrad.[1]

* *Unio nodiferus* CONRAD, Pr. Ac. N. Sci. Phila., I, 1841, p. 19; * Jl. Ac. N. Sci. Phila., VIII, 1842, p. 179; I, 1850, p. 277, pl. XXXVIII, figs. 4, 8; * Pr. Ac. N. Sci. Phila., VI, 1853, p. 253.

Louisiana and eastern Texas.

†QUADRULA CAHABENSIS Lea.

* *Unio cahabensis* LEA, Pr. Ac. N. Sci. Phila., XXIII, 1871, p. 190; * Jl. Ac. N. Sci. Phila., VIII, 1874, p. 17, pl. v, fig. 14; * Obs., XIII, 1874, p. 21, pl. v, fig. 14.—* B. H. WRIGHT, Check List, 1888.

Cahawba River, Alabama.

†QUADRULA VALLATA Lea.

* *Unio vallatus* LEA, Pr. Ac. N. Sci. Phila., XII, 1868, p. 145; * Jl. Ac. N. Sci. Phila., 1869, p. 315, pl. L, fig. 128; * Obs., XII, 1869, p. 75, pl. L, fig. 128.—* B. H. WRIGHT, Check List, 1888.
* *Margaron (Unio) vallatus* LEA, Syn., 1870, p. 34.

Alabama and Black Warrior rivers, Alabama.

†QUADRULA REFULGENS Lea.

* *Unio refulgens* LEA, Pr. Ac. N. Sci. Phila., XII, 1868, p. 145; * Jl. Ac. N. Sci. Phila., VI, 1869, p. 317, pl. LI, fig. 130; * Obs., XII, 1869, p. 77, pl. LI, fig. 130.—* B. H. WRIGHT, Check List, 1888.
* *Margaron (Unio) refulgens* LEA, Syn., 1870, p. 34.
* *Unio pustulosus* CALL (part), Tr. Ac. Sci. St. Louis, VII, 1895, p. 42, pl. XV, figs. 3, 4.

Mississippi and probably Alabama.

†QUADRULA HOUSTONENSIS Lea.

* *Unio houstonensis* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 155; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 358, pl. LX, fig. 183; * Obs., VIII, p. 40, pl. LX, fig. 183.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXI, fig. 425.—* B. H. WRIGHT, Check List, 1888.
* *Margaron (Unio) houstonensis* LEA, Syn., 1870, p. 55.

Texas, Louisiana, and southern Arkansas. Verdigris River, Kansas?

[1] There are six shells bearing the name *Unio nodiferus* Conrad in the Philadelphia Academy of Natural Sciences. Part of them are the same as figured in the Journal, and the rest are probably *mortoni*.

†QUADRULA PETRINA Gould.

* *Unio petrinus* GOULD, Pr. Bost. Soc. N. Hist., V, 1855, p. 228; * Otia Conch., 1862, p. 218.—* B. H. WRIGHT, Check List, 1888.
* *Margaron* (*Unio*) *petrinus* LEA, Syn., 1870, p. 55.

Texas. Cragin's localities, Verdigris and Neosho rivers, Kansas, are probably erroneous.

†QUADRULA AUREA Lea.

* *Unio aureus* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 112; * Jl. Ac. N. Sci. Phila., V, 1862, p. 195, pl. XXVI, fig. 264; * Obs., IX, 1863, p. 17, pl. XXVI, fig. 264.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXIII, fig. 438.—* B. H. WRIGHT, Check List, 1888.—* PAETEL, Conch. Sam., III, 1890, p. 145.
* *Margaron* (*Unio*) *aureus* LEA, Syn., 1870, p. 37.
* *Unio bolli* CALL, Am. Naturalist, XV, 1881, p. 390.[1]

Texas.

†QUADRULA PAUPERCULA Lea.

* *Unio pauperculus* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 39; * Jl. Ac. N. Sci. Phila., V, 1862, p. 99, pl. XV, fig. 247; * Obs., VIII, 1862, p. 103, pl. XV, fig. 247.—* B. H. WRIGHT, Check List, 1888.
* *Margaron* (*Unio*) *pauperculus* LEA, Syn., 1870, p. 55.[2]

Texas.

(Group of *Quadrula infucata.*)

Shell small, rounded rhomboid, with a low, distinct posterior ridge, truncated behind and angled back of the ligament; beaks moderately elevated, subcentral; beak sculpture, four or five coarse, subparallel ridges which curve upward behind, with fine, radial ridges between them and the ligament; surface blackish, sculptured with zigzag or chevron-shaped corrugations which often become pustulous below; posterior slope having radial, broken wrinkles; pseudocardinals small, stumpy; secondary lateral of the right valve present; beak cavities moderately deep, slightly compressed; anterior scars small, smooth; nacre rather dull, purplish.

Animal with the marsupium occupying all four leaves of the gills; inner gills the larger, free from the abdominal sac only part of their length; anal opening without papillæ.[3]

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[1] An inflated form.

[2] Usually entirely free from sculpture excepting faint corrugations on the posterior slope. A specimen belonging to Mr. William A. Marsh, from Village Creek, Texas, shows slight tuberculation on the disks.

[3] I have been puzzled as to the relationship of this group and have been strongly inclined to place it near *chickasawchensis*, but I now believe it is more closely allied to the *Pustulosa* group. Its posterior truncation, the prominent angle behind the ligament, and beak sculpture lead me to place it here. The general sculpture of *Q. petrina* approaches that of these species.

† QUADRULA INFUCATA Conrad.

* *Unio infucatus* CONRAD, New F. W. Shells, 1834, p. 45, pl. III, fig. 2, p. 70.—* MÖLLER, Syn. Nov. Gen., 1836, p. 208.—* FERUSSAC, Guer. Mag., 1835, p. 29.—* HANLEY, Test. Moll., 1842, p. 203; * Biv. Shells, 1843, p. 203.—* CHENU, Bib. Conch., 1st ser., III, 1845, p. 22, pl. II. fig. 6.—* CATLOW and REEVE, Conch. Nom., 1845, p. 60.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 250.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* KUSTER, Conch. Cab. Unio, 1861, p. 176, pl. LV, fig. 5.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XL, fig. 221.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 155.—* SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 409, pl XLIX, figs. 1–3, 6.

* *Margarita* (*Unio*) *infucatus* LEA, Syn., 1836, p. 34; 1838, p. 23.

* *Margaron* (*Unio*) *infucatus* LEA, Syn., 1852, p. 20; 1870, p. 30.

* *Unio securiformis* CONRAD, [1] Ann. and Mag., IV, 1849, p. 300; Pr. Ac. N. Sci. Phila., * I, 1850, p. 275 pl. XXXVII, fig. 1; *IV, 1849, p. 152; *VI, 1852, p. 257—* PÆTEL, Conch. Sam., III, 1890, p. 167.

Chattahoochee and Flint rivers, Georgia.

† QUADRULA KLEINIANA Lea.[2]

* *Unio kleinianus* LEA, Pr. Am. Phil. Soc., V, 1852, p. 251; * Tr. Am. Phil. Soc., X, 1852, p. 265, pl. XVII, fig. 18; * Obs., V, 1852, p. 21, pl. XVII, fig. 18.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 257.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 498.—* REEVE, Conch. Icon., XVI, 1864, pl. II, fig. 6.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 156.

* *Margaron* (*Unio*) *kleinianus* LEA, Syn., 1852, p. 20; 1870, p. 30.

* *Unio sparsus* KUSTER, Conch. Cab. Unio, 1861, p. 252, pl. LXXXV, fig. 2.

Southern Georgia; northern Florida.

Section FUSCONAIA Simpson, 1900.

(Type, *Unio trigonus* Lea.)

Shell round, rhomboid, triangular, or short elliptical, with a moderate posterior ridge; beaks high and full, curved inward and forward, sculptured with a few coarse, parallel ridges which curve upward behind; epidermis dark; surface not sculptured; hinge plate of moderate width; pseudocardinals strong; nacre white, salmon, or purple.

Animal having all four gills occupied throughout as a marsupium, filled with pink or purplish ova when gravid; inner gills much the wider in front, free generally from the abdominal sac; outer gills cut away slopingly in front.

(Group of *Quadrula beadleiana*.)

Shell moderately solid, somewhat triangularly rounded, bluntly pointed and sometimes slightly biangular at post base, with a more or less developed posterior ridge, in front of which it is full; beaks not

[1] A rather smooth *infucatus*.

[2] In the Proceedings of the U. S. National Museum, XV, 1892, p. 404, I united this species with *Unio infucatus* Conrad. Further study of additional material and of the animals which show some differences has induced me to separate the two.

very high; beak sculpture very coarse, concentric ridges;[1] disks irregularly concentrically striate; epidermis rich, dark chestnut; hinge plate rather narrow; pseudocardinals radial, stumpy; cavity of the beaks only moderately deep.

No gravid specimens have been seen, but those examined do not seem to differ from others of the genus.

†QUADRULA CHICKASAWHENSIS Lea.

* *Unio chickasawhensis* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 39; *Jl. Ac. N. Sci. Phila., V, 1862, p. 101, pl. XVI, fig. 250; * Obs., VIII, 1862, p. 105, pl. XVI, fig. 250.—* B. H. WRIGHT, Check List, 1888.

Margaron (*Unio*) *chickasawhensis* LEA, Syn., 1870, p. 55.

Mississippi and Louisiana.

†QUADRULA SUCCISSA Lea.

* *Unio succissus* LEA, Tr. Am. Phil. Soc., X, 1852, p. 275, pl. XXI, fig. 32; * Obs., V, 1852, p. 31, pl. XXI, fig. 32.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 496.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXIII, fig. 174.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 169.—* SIMPSON, Pr. U. S. Nat. Mus., XV, 1892, p. 29, pl. LXXI, fig. 5.

* *Margaron* (*Unio*) *succissus* LEA, Syn., 1852, p. 24; 1870, p. 38.

† * *Unio cacao* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 154; *Jl. Ac. N. Sci. Phila., IV, 1860, p. 344, pl. LVI, fig. 169; * Obs., VIII, 1860, p. 26, pl. LVI, fig. 169.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *cacao* LEA, Syn., 1870, p. 54.

West Florida; southern Alabama.

†QUADRULA PUMILA Lea.

* *Unio pumilus* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 23, pl. VII, fig. 17; * Obs., II, 1838, p. 23, pl. VII, fig. 17.—* TROSCHEL, Arch. für Naturg., V, 1839, Pt. 2, p. 234.—* HANLEY, Test. Moll., 1842, p. 185; * Biv. Shells, 1843, p. 185, pl. XXIII, fig. 13.—* CATLOW and REEVE, Conch. Nom., 1845, p. 63.—* CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 255.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* CHENU, Ill. Conch., 1858, pl. XIX, figs. 1, 1*a*, 1*b*.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXVI, fig. 198.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 164.

* *Margarita* (*Unio*) *pumilus* LEA, Syn., 1836, p. 20; 1838, p. 17.

* *Margaron* (*Unio*) *pumilus* LEA, Syn., 1852, p. 24; 1870, p. 37.

Black River, North Carolina. Only the type shell, a small specimen, not in very good condition, has been seen by me.

††QUADRULA UTRICULUS Lea.

* *Unio utriculus* LEA, Pr. Am. Phil. Soc., IV, 1845, p. 161; * Tr. Am. Phil. Soc., X, 1848, p. 69, pl. I, fig. 3; Obs., IV, 1848, p. 43, pl. I, fig. 3.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 259.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *utriculus* LEA, Syn., 1870, p. 46.,

North Carolina. The specimen in the Lea collection which came from Arkansas is not this species at all.

[1] According to Marsh, who has examined the beak sculpture of *Q. askewi*. I have never seen a specimen of the group in which it was not all eroded away.

†QUADRULA BEADLEIANA Lea.

* *Unio beadleianus* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 39; * Jl. Ac. N. Sci. Phila., V, 1862, p. 94, pl. XIV, fig. 242; * Obs., VIII, 1862, p. 98, pl. XIV, fig. 242.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *beadleianus* LEA, Syn., 1870, p. 55.

Mississippi to eastern Texas.

†QUADRULA ASKEWI Marsh.

* *Unio askewi* MARSH, Nautilus, X, 1896, p. 91; X, 1897, pl. I, figs. 3, 4.

Western Louisiana; eastern Texas.

(Group of *Quadrula trigona.*)

Shell triangular, generally inflated, with high, full beaks which are incurved and turned forward over a well-developed lunule; anterior end obliquely truncate above, often with a curved, shallow depression in each valve running from the beaks to midway down the anterior end, and forming a sort of secondary lunule; posterior base usually incurved; the posterior ridge ending in a rather sharp point; beak sculpture, a few coarse, concentric ridges turned upward behind and often swollen on the posterior ridge, sometimes becoming finer and broken or irregular on the upper disk; hinge solid but not very wide; pseudocardinals triangular and radial, torn; there is a secondary lateral in the right valve; cavity of the beaks generally deep and compressed; muscle scars small, deep.

Animal with the marsupium occupying the whole of all four branchiæ; inner gills generally free from the abdominal sac, much wider than the outer in front; outer nearly or quite equaling them in width behind; anal opening distinctly crenulate or papillose.

†QUADRULA RUBIGINOSA Lea.

* *Unio rubiginosus* LEA, Tr. Am. Phil. Soc., III, 1829, p. 427, pl. VIII, fig. 10; * Obs., I, 1834, p. 41, pl. VIII, fig. 10.—* DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 548.—* HANLEY, Test. Moll., 1842, p. 185; * Biv. Shells, 1843, p. 185, pl. XXI, fig. 43.—* CATLOW and REEVE, Conch. Nom., 1845, p. 63.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* CHENU, Ill. Conch., 1858, pl. XIII, figs. 4, 4*a*, 4*b*.—* REEVE, Conch. Icon., XVI, 1865, pl. XXVII, fig. 136.—* CALKINS, Pr. Ottawa Acad. Sci., 1874, p. 44.—* B. H. WRIGHT, Check List, 1888.—* WALTON, Moll. Monroe Co., 1892, p. 16, pl. VIII, fig. 1.

* *Margarita* (*Unio*) *rubiginosus* LEA, Syn., 1836, p. 20; 1838, p. 17.

* *Margaron* (*Unio*) *rubiginosus* LEA, Syn., 1852, p. 24; 1870, p. 37.

* *Unio rubiginosa* DESHAYES, An. sans Vert., 3d ed., II, 1839, p. 672.

* *Quadrula rubiginosa* BAKER, Moll. Chicago, Pt. 1, 1898, p. 77, pl. XIX, fig. 2; XX, fig. 1.

* *Unio flavus* CONRAD, New F. W. Shells, 1834, p. 69.—* SAY, Am. Conch., VI, 1834.—* FERUSSAC, Guer. Mag., 1835, p. 27.—* CONRAD, Monog., IX, 1837, p. 74, pl. XLI, fig. 2.—* KUSTER, Conch. Cab., 1852, p. 61, pl. XIV, fig. 2; p. 265, pl. LXXXIX, fig. 5.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 249.

* *Unio flavus* var. *rubiginosus* PÆTEL, Conch. Sam., III, 1890, p. 152.

* *Unio trigonus* SOWERBY, Conch. Icon., XVI, 1868, pl. LXIV, p. 322.

Entire Mississippi drainage; eastern Texas; St. Lawrence River system; Nelson River and its tributaries.

†QUADRULA CERINA Conrad.

**Unio cerinus* CONRAD, Monog., XI, 1838, p. 95, pl. LII; *Pr. Ac. N. Sci. Phila., VI, 1853, p. 246.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXVII, fig. 468.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 147.

Louisiana; eastern Texas; Mississippi; Alabama; north to Arkansas.

†QUADRULA HEBETATA Conrad.

**Unio hebetatus* CONRAD, *Jl. Ac. N. Sci. Phila., II, 1854, p. 296, pl. XXVI, fig. 5.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *habetatus* LEA, Syn., 1870, p. 38.

Missouri; Tuscaloosa River, Alabama.

†QUADRULA RUBIDA Lea.

**Unio rubidus* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 40; *Jl. Ac. N. Sci. Phila., V, 1862, p. 95, pl. XIV, fig. 244; *Obs., VIII, 1862, p. 99, pl. XIV, fig. 244.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Unio*) *rubidus* LEA, Syn., 1870, p. 35.

†**Unio negatus* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 59; *Jl. Ac. N. Sci. Phila., V, 1862, p. 76, pl. IX, fig. 225; Obs., VIII, 1862, p. 80, pl. IX, fig. 225.—*SOWERBY, Conch. Icon., XVI, 1866, pl. XXXII, fig. 165.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 160.

**Margaron* (*Unio*) *negatus* LEA, Syn., 1870, p. 35.

Streams flowing into the Gulf of Mexico from Alabama to Louisiana. The shell reported under the name *Unio negatus*, from Kansas, is probably a somewhat sulcate *rubiginosus*.

†QUADRULA CHUNII Lea.

Unio chunii LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 392; *Jl. Ac. N. Sci. Phila., V, 1862, p. 196, pl. XXVII, p. 265; *Obs., IX, 1863, p. 18, pl. XXVII, fig. 265.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, III, 1890, p. 148.

**Margaron* (*Unio*) *chunii* LEA, Syn., 1870, p. 38.

Mississippi; west to central Texas north to Arkansas.

†QUADRULA RIDDELLII Lea.

**Unio riddellii* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 392; *Jl. Ac. N. Sci. Phila., V, 1862, p. 198, pl. XXVII, fig. 267; *Obs., IX, 1863, p. 20, pl. XXVII, fig. 267.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXIII, fig. 442.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 165.

**Margaron* (*Unio*) *riddellii* LEA, Syn., 1870, p. 38.

Dallas, Texas.

†QUADRULA FRIERSONI B. H. Wright.

**Unio friersoni* B. H. WRIGHT, Nautilus, IX, 1896, p. 134, pl. III.

Louisiana; eastern Texas.

†QUADRULA TRIGONA Lea.

**Unio trigonus*, LEA, Tr. Am. Phil. Soc., IV, 1831, p. 110, pl. XVI, fig. 40; *Obs., I, 1834, p. 120, pl. XVI, fig. 40.—*HANLEY, Test. Moll., 1842, p. 185; *Biv. Shells, 1843, p. 185, pl. XXI, fig. 6.—*CATLOW and REEVE, Conch. Nom., 1845, p. 64.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 258.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 496.—*CHENU, Ill. Conch., 1858, pl. XVI, figs. 7, 7*a*, 7*b*.—

*SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXVI, fig. 459.—*CALKINS, Pr. Ottawa Acad. Sci., 1874, p. 45.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 170.

*_Margarita (Unio) trigonus_ LEA, Syn., 1836, p. 18; 1838, p. 17.

*_Margaron (Unio) trigonus_ LEA, Syn., 1852, p. 25; 1870, p. 38.

*_Quadrula trigona_ BAKER, Moll. Chicago, Pt. 1, 1898, p. 76, pl. XV, fig. 5.

*_Unio undatus_ CONRAD, New F. W. Shells, 1834, p. 72.—*SAY, Am. Conch., VI, 1834.

*_Unio triangularis_ KUSTER, Conch. Cab. Unio, 1852, p. 56, pl. XII, fig. 3.

*_Unio pilaris_ REEVE, Conch. Icon., XVI, 1865, pl. XXVII, fig. 138.

Entire Mississippi drainage; Coosa River, Alabama; Michigan and the Upper St. Lawrence drainage.

†QUADRULA OBLIQUA Lamarck.

*_Unio obliqua_ LAMARCK, An. sans Vert., VI, 1819, p. 72.—*FERUSSAC, Gner. Mag., 1835, p. 28.—*DESHAYES, An. sans Vert, 2d ed., 1835, p. 534; 3d ed., II, 1839, p. 668.

*_Margarita (Unio) obliqua_ LEA, Syn., 1836, p. 20.

*_Unio obliquus_ HANLEY, Test. Moll., 1842, p. 186; *Biv. 1843, p. 186, pl. XX, fig. 24.—*CATLOW and REEVE, Conch. Nom., 1845, p. 61.—*KUSTER, Conch. Cab. Unio, 1852, p. 63, pl. XV, fig. 1.—*CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 253.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—*CALKINS, Pr. Ottawa Acad. Sci., 1874, p. 44.—*PÆTEL, Conch. Sam., III, 1890, p. 161.—*CALL, Tr. Ac. Sci. St. Louis, VII, 1895, p. 31, pl. IV.

*_Margarita (Unio) obliquus_ LEA, Syn., 1838, p. 17.

*_Margaron (Unio) obliquus_ LEA, Syn., 1852, p. 25; 1870, p. 38.

*_Unio undatus_ BARNES, Am. Jl. Sci., VI, 1823, p. 121, pl. IV, fig. 4.—*HILDRETH, Am. Jl. Sci., XIV, 1828, p. 280.[1]—*CONRAD, Pr. Ac. Nat. Sci. Phila., VI, 1853, p. 259.

*_Mya undata_ EATON, Zool. Text-Book, 1826, p. 219.

*_Unio mytiloides_ SHORT and EATON, Transylvania Jl., 1831, p. 74.

*_Unio cordatus_ CONRAD, Monog., V, 1836, p. 48, pl. XXV.—*KUSTER, Conch. Cab., 1852, p. 57, pl. XIII, fig. 1.—*SOWERBY, Couch. Icon., XVI, 1868, pl. LXXIII, 376.—*B. H. WRIGHT, Check List, 1888.

Ohio, Cumberland, and Tennessee river systems; west in Illinois to the Mississippi; Claiborne, Alabama.

†QUADRULA COCCINEA Conrad.

*_Unio coccineus_ CONRAD,[2] Monog., III, 1836, p. 29, pl. XIII, fig. 1.—LEA, Tr. Am. Phil. Soc., VI, 1838, p. 12, pl. V, fig. 12; *Obs., II, 1838, p. 12, pl. V, fig. 12.—*TROSCHEL, Arch. für. Naturg., V, 1839, Pt. 2, p. 234.—*HANLEY, Test. Moll. 1842, p. 203; *Biv. Shells, 1843, p. 203, pl. XXII, fig. 54.—*CATLOW and REEVE,

[1] This was figured by Hildreth, but the figures of this species and a number of others were left out by the editor.

[2] In the Transactions of the American Philosophical Society, VI, 1838, p. 12, pl. V, fig. 12, Lea described this species, and stated that about eighteen months previous Dr. Hildreth had sent him a single specimen under the name *Unio coccineus;* but there is nothing to show that Hildreth had described it. In the Monography in 1836, III, p. 29, pl. XIII, fig. 1, Conrad describes this species under the same name, and also credits it to Hildreth, stating that it was in the collection of the Philadelphia Academy of Natural Sciences under that name. The species must be credited to Conrad, who first described it, though Lea read his description in 1834.

Conch. Nom., 1845, p. 57.—*KUSTER, Conch. Cab., 1852, p. 49, pl. X, fig. 2.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 247.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—*CHENU, Ill. Conch., 1858, pl. XXV, figs. 4, 4*a*, 4*b*.—*SOWERBY, Conch. Icon., XVI, 1868, pl. XCIV, fig. 512.—*CALKINS, Pr. Ottawa Acad. Sci., I, 1874, p. 42.—*B. H. WRIGHT, Check List, 1888.—*P.ETEL, Conch. Sam., III, 1890, p. 148.

* *Margarita* (*Unio*) *coccinea* LEA, Syn., 1836, p. 34; 1838, p. 23.

* *Margaron* (*Unio*) *coccineus* LEA, Syn., 1852, p. 35; 1870, p. 56.

* *Quadrula coccinea* BAKER, Moll. Chicago, Pt. 1, 1898, p. 79, pl. XIV, fig. 1; XIX, fig. 3.

* *Unio rubens* MENKE, Syn., Meth. Moll., 1828, p. 90.

* *Unio catillus* CONRAD, Monog., III, 1836, p. 30, pl. XIII, fig. 2.—*KUSTER, Conch. Cab., 1852, p. 64, pl. XV, fig. 2.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 246.—*P.ETEL, Conch. Sam., III, 1890, p. 147.

* *Unio catilus* B. H. WRIGHT, Check List, 1888.

* *Unio gouldianus* WARD,[1] Jay's Catalogue, 3d ed., 1839, p. 24.

* *Unio cuneus* CALL, Tr. Ac. Sci. St. Louis, VII, p. 14.

† QUADRULA COCCIENEA var. PAUPERCULA Simpson.[2]

Entire Upper Mississippi drainage; St. Lawrence basin in various localities. The peculiar dwarf variety which is found in this latter area seems almost entitled to specific rank.

† QUADRULA SOLIDA Lea.

Unio solidus LEA, Tr. Am. Phil. Soc., VI, 1838, p. 13, pl. V, fig. 13; *Obs., II, 1838, p. 13, pl. V, fig. 13.—*TROSCHEL, Arch. für Naturg., V, 1839, Pt. 2, p. 234.—*HANLEY, Test. Moll., 1842, p. 186; *Biv. Shells, 1843, p. 186, pl. XXIII, fig. 15.—*CATLOW and REEVE, Conch. Nom., 1845, p. 64.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 496.—*CHENU, Ill. Conch., 1858, pl. XXV, figs. 2, 2*a*, 2*b*.—*KUSTER, Conch. Cab., 1861, p. 258, pl. LXXXVII, fig. 4.—*REEVE, Conch. Icon., XVI, 1865, pl. XXVII, fig. 133.—*CALKINS, Pr. Ottawa Acad. Sci., 1874, p. 45.—*B. H. WRIGHT, Check List, 1888.—*P.ETEL, Conch. Sam., III, 1890, p. 168.

* *Margarita* (*Unio*) *solidus* LEA, Syn., 1836, p. 20; 1838, p. 17.

* *Margaron* (*Unio*) *solidus* LEA, Syn., 1852, p. 25; 1870, p. 38.

* ? *Unio cardiacea* DESHAYES, Tr. Elem. de Conch., 1839, p. 19, pl. XXXI, figs. 1, 2.

* *Unio fulgidus* LEA,[3] Pr. Am. Phil. Soc., IV, 1845, p. 164; *Tr. Am. Phil. Soc., X, 1848 p. 73, pl. IV, fig. 10; *Obs., IV, 1848, p. 47, pl. IV, fig. 10.—*CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 249.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—*B. H. WRIGHT, Check List, 1888.—*P.ETEL, Conch. Sam., III, 1890, p. 253.

* *Margaron* (*Unio*) *fulgidus* LEA, Syn., 1852, p. 25; 1870, p. 38.

* *Unio obovalis* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 253.

Ohio, Cumberland, and Tennessee river systems; south to Louisiana; west to Arkansas and Kansas; north to Minnesota; east, through Wisconsin, Illinois, and Indiana, to Ohio.

[1] Adopted by Dr. Jay and used in his catalogue, but never described. It is a white nacred *coccinea*.

[2] There is a dwarf form, greatly inflated and having the rest periods very plainly marked, found in the St. Lawrence and its tributaries near the Niagara Falls, which may bear the above varietal name.

[3] There is only the type, a young shell, in Lea's collection, and I have no hesitation in referring it to *solidus*.

†QUADRULA PLENA Lea.

* *Unio plenus* LEA, Tr. Am. Phil. Soc., I, 1840, p. 286; *Tr. Am. Phil. Soc., VIII, 1843, p. 211, pl. XIV, fig. 26; *Obs., III, 1842, p. 49, pl. XIV, fig. 26.—*CONRAD, Proc. Ac. N. Sci. Phila., VI, 1853, p. 255.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—*KUSTER, Conch. Cab., 1861, p. 264, pl. LXXXIX, fig. 3.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXI, fig. 305.—*B. H. WRIGHT, Check List, 1888.—*P.ETEL, Conch. Sam., III, 1890, p. 163.

* *Margaron* (*Unio*) *plenus* LEA, Syn., 1852, p. 25; 1870, p. 39.

Ohio, Cumberland, and Tennessee river systems; southwest to Kansas and Arkansas.

QUADRULA FLEXUOSA Simpson.

Holston River, Tennessee.

Quadrula flexuosa SIMPSON, Proc. Ac. N. Sci. Phila., 1900, p. 83, pl. II, fig. 8.

†QUADRULA PYRAMIDATA Lea.

* *Unio pyramidatus* LEA, Tr. Am. Phil. Soc., IV, 1834, p. 109, pl. XVI, fig. 39; *Obs., I, 1834, p. 119, pl. XVI, fig. 39.—*HANLEY, Test. Moll., 1842, p. 186; *Biv. Shells, 1843, p. 186, pl. XX, fig. 45.—*DESHAYES, Traite Elem. de Conch., II, 1850?, p. 216, pl. XXXI, figs. 1, 2.—*CATLOW and REEVE, Conch. Nom., 1845, p. 63.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—*CHENU, Ill. Conch., 1858, pl. XVI, figs. 5, 5*a*, 5*b*.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXIV, p. 323.—*B. H. WRIGHT, Check List, 1888.

* *Margarita* (*Unio*) *pyramidatus* LEA, Syn., 1836, p. 21; 1838, p. 17.

* *Margaron* (*Unio*) *pyramidatus* LEA, Syn., 1852, p. 25; 1870, p. 39.

* *Unio mytiloides* DESHAYES, Enc. Meth., II, 1830, p. 586, pl. CCXLIX, fig. 4.—*SAY, Am. Conch., Pt. 6, 1834.—*FERUSSAC, 1835, p. 28.—*MÖLLER, Syn. Nov. Gen., 1836, p. 209.—*CONRAD, Monog., IV, 1836, p. 41, pl. XX.—*SWAINSON, Treatise on Mal., 1840, p. 267, figs. 52–53.—*CATLOW and REEVE, Conch. Nom., 1845, p. 61.—*KUSTER, Conch. Cab., 1852, p. 59, pl. XIII, fig. 3; 1861, p. 265, pl. LXXXIX, fig. 4.—*B. H. WRIGHT, Check List, 1888.

* *Margarita* (*Unio*) *mytiloides* LEA, Syn., 1836, p. 21; 1838, p. 17.

* *Margaron* (*Unio*) *mytiloides* LEA, Syn., 1852, p. 25; 1870, p. 39.

* *Unio mytiloides* Rafinesque var. *pyramidatus* P.ETEL, Conch. Sam., III, 1890, p. 160.[1]

* *Unio cardiacea* GUERIN, Icon. Regne Animal, 1829?, II, pl. XXVIII, fig. 7.

* *Unio ruber* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 257.

* *Unio obliqua* WOOD, Ind. Test. rev., 1856, p. 200, pl. I, fig. 8.

Ohio, Cumberland, and Tennessee river systems; southwest to Arkansas; west to Nebraska?; north in the Mississippi to Wisconsin.

(Group of *Quadrula subrotunda*.)

Shell solid, rounded, elliptical or ovate, with high beaks curved inward and forward over a distinct lunule; beak sculpture a few coarse

[1] Most of the authors who use the name *mytiloides* believe it to be Rafinesque's species, though they figure and describe the *pyramidatus* of Lea. The specimens in the Lea collection which Dr. Lea calls *mytiloides* Rafinesque, are evidently a form of his *pyramidatus*. Rafinesque's figure represents a shell very long and almost straight on the posterior dorsal line, with astonishingly high beaks, and four distinct, equally separated rays on the disk, and he says there are some oblique, black, longitudinal bands on the shell. The Rafinesquian shell seems as near to the *Unio clava* of Lamarck as anything, but it does not agree with that.

ridges curved up behind; posterior ridge feebly developed; epidermis brownish or blackish, and often painted with a few faint rays on the earlier shell which are disposed to break into squarish spots; hinge and teeth strong; secondary lateral in right valve well developed; beak cavities deep, compressed; muscle scars deep. Animal with all four gills used as a marsupium throughout, filled with pink ova; gills large, inner only slightly the larger, free the greater part of their length; anal opening crenulate or papillose.

† QUADRULA BURSA-PASTORIS B. H. Wright.

* *Unio bursa-pastoris* B. H. WRIGHT, Nautilus., IX, 1896, p. 133, pl. III.

Clinch and Powell rivers; Virginia and Tennessee.

† QUADRULA KIRTLANDIANA Lea.

* *Unio kirtlandianus* LEA, Tr. Am. Phil. Soc., V, 1834, p. 98, pl. XIV, fig. 41; * Obs., I, 1834, p. 210, pl. XIV, fig. 41.—* FERUSSAC, Guer. Mag., 1835, p. 29.—* HANLEY, Biv. Shells, 1843, p. 203, pl. XXIII, fig. 27.—* CATLOW and REEVE, Conch. Nom., 1845, p. 60.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 251.—* KUSTER, Conch. Cab., 1856, p. 168, pl. XLIX, figs. 2, 3; 1861, p. 214, pl. LXXI, fig. 1.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXVII, fig. 402.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 156.

* *Margarita* (*Unio*) *kirtlandianus* LEA, Syn., 1836, p. 34; 1838, p. 23.

* *Margaron* (*Unio*) *kirtlandianus* LEA, Syn., 1852, p. 35; 1870, p. 56.

* *Unio kirklandianus* HANLEY, Test. Moll., 1842, p. 203.[1]

† QUADRULA KIRTLANDIANA var. MINOR Simpson.[2]

Ohio, Cumberland, and Tennessee river systems; southwest to Arkansas; north to Wisconsin?; east through southern Michigan.

† QUADRULA SUBROTUNDA Lea.[3]

* *Unio subrotundus* LEA, Tr. Am. Phil. Soc., IV, 1831, p. 117, pl. XVIII, fig. 45; * Obs., I, 1834, p. 127, pl. XVIII, fig. 45.—* HANLEY, Test. Moll., 1842, p. 203; * Biv. Shells, 1843, p. 203, pl. XX, fig. 58.—* CATLOW and REEVE, Conch. Nom., 1845, p. 64.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—* ?CHENU, Ill.

[1] A typographical error no doubt. There is a *Unio kirklandianus* recently named by Wright.

[2] A form is found in the Tennessee drainage which comes nearest, it seems to me, to the *kirtlandianus* of Lea, but is much smaller and more delicate, and is not so strongly colored. Mr. Wetherby believes this to be a form of the nearly allied *subrotundus*, but it seems to me too much compressed for that. Dr. Sterki is of the opinion that the two species should be united. While there are specimens which can hardly be determined, it seems to me that in the main the two are distinct. The small form may be called variety *minor*.

[3] The name *subrotunda* was used by Rafinesque in 1820 for some species of *Naiad*, probably a member of the *Circulus* group which I can not determine, and placed in the genus *Obliquaria* by him. Conrad afterwards, in 1834, placed what he supposed was this species in the genus *Unio*. Lea applied the name *subrotundus* to his species in 1831, and being the first to use it for that genus, I think it will have to stand, and Conrad's name become a synonym.

Conch., 1858, pl. XV, figs. 1, 1*a*, 1*b*.—* KUSTER, Conch. Cab., 1861, p. 190, pl. LX, fig. 3.—* B. H. WRIGHT, Check List, 1888.

* *Margarita* (*Unio*) *subrotundus* LEA, Syn., 1836, p. 34; 1838, p. 23.

* *Margaron* (*Unio*) *subrotundus* LEA, Syn., 1852, p. 35; 1870, p. 56.

* ? *Unio brevialis* CROUCH, Ill. Int. to Lamarck, 1827, p. 16, pl. IX, fig. 3.[1]—* ? CATLOW and REEVE, Conch. Nom., 1845, p. 56.

* *Unio personatus* CONRAD, New F. W. Shells, 1834, p. 71.

* *Unio politus* SAY, Am. Conch., VI, 1834.[2]—* FERUSSAC, Guer. Mag., 1835, p. 28.—* CONRAD, Monog., VIII, 1837, p. 67, pl. XXXVII, fig. 2.—* KUSTER, Conch. Cab. Unio, 1852, p. 62, pl. XIV, fig. 4.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 255.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXII, p. 168.—* PÆTEL, Conch. Sam., III, 1890, p. 164.[3]

Ohio, Cumberland, and Tennessee river systems. Reported from Michigan and the Grand River, Ontario, but it is probable that the material from these localities is not *subrotundus*.

† QUADRULA PILARIS Lea.

* *Unio pilaris* LEA, Pr. Am. Phil. Soc., I, 1840, p. 285; Tr. Am. Phil. Soc., VIII, 1842, p. 209, pl. XIV, fig. 24; Obs., III, 1842, p. 47, pl. XIV, fig. 24.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 255.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—* CHENU, Ill. Conch., 1858, pl. XXIX, figs. 3, 3*a*, 3*b*.—* KUSTER, Conch Cab., 1861, p. 255, pl. LXXXVI, fig. 3.—* REEVE, Conch. Icon., XVI, 1865, pl. XXVII, fig. 138.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 163.

* *Margaron* (*Unio*) *pilaris* LEA, Syn., 1852, p. 35; 1870, p. 56.

† * *Unio lesueurianus* LEA, Pr. Am. Phil. Soc. I, 1840, p. 286; * Tr. Am. Phil. Soc., VIII, 1842, p. 195, pl. VIII, fig. 6; * Obs., III, 1842, p. 33, pl. VIII, fig. 6.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 251.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—* CHENU, Ill. Conch., 1858, pl. XXX, figs. 4, 4*a*, 4*b*.—* KUSTER, Conch. Cab. Unio, 1861, p. 215, pl. LXXII, fig. 2.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 157.

* *Margaron* (*Unio*) *lesueurianus* LEA, Syn., 1852, p. 35; 1870, p. 56.

Tennessee and Cumberland river sytems; Green River, Kentucky; reported from the Ohio River.

† QUADRULA CUNEUS Conrad.[4]

* *Unio cuneus* CONRAD, Monog., XII, 1840, p. 105; pl. LVIII, fig. 1.—* B. H. WRIGHT, Check List, 1888.

Arkansas; Louisiana; Sabine River, Texas.

[1] The figure looks something like *subrotunda*, or it may possibly be *ebenus*. I can not make out Lamarck's *brevialis* (An. sans Vert., VI, 1819, p. 75), which he says came from the Isle de France. Sganzin was told by the people of the island that no *Unio* was found there (Mem. Hist. Nat. Strasb., III, 1846, p. 8).

[2] Merely listed by Say, but neither Lea nor I have been able to find that it was ever described by him.

[3] Kirtland states that an oblique sulcation below the superior posterior angle distinguishes the female of this species, as it does the *retusus*, from the male. I have not noticed it.

[4] Mr. Conrad states in the Monography that his shells came from the Little Red River, Arkansas. Our shells in the U. S. National Museum collection are from the same stream, but are not quite so solid, nor are they just the shape of the figure, yet I have no doubt that they are *cuneus*.

†QUADRULA EBENUS Lea.

* *Unio ebenus* LEA, Tr. Am. Phil. Soc., IV, 1831, p. 84, pl. IX, fig. 14; * Obs., I, 1834, p. 94, pl. IX, fig. 14.—*CONRAD, New F. W. Shells, 1834, p. 69.—* HANLEY, Test. Moll., 1842, p. 202; *Biv. Shells, 1843, p. 202, pl. XX, fig. 47.—* CATLOW and REEVE, Conch. Nom., 1845, p. 58.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—*CHENU, Ill. Conch., 1858, pl. XV, figs. 7, 7*a*, 7*b*.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXVI, fig. 334.—*CALKINS, Pr. Ottawa Acad. Sci., 1874, p. 42.—* B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 151.

* *Margarita* (*Unio*) *ebenus* LEA, Syn., 1836, p. 34; 1838, p. 23.

* *Margaron* (*Unio*) *ebenus* LEA, Syn., 1852, p. 35; 1870, p. 56.

* *Unio obovalis* SAY, Am. Conch., VI, 1834.

* *Unio obliquus* CONRAD, Monog., IX, 1837, p. 77, pl. XLIII, fig. 2.—* KUSTER, Conch. Cab. Unio, 1861, p. 215, pl. LXXI, fig. 4.

* *Unio mytiloides* SWAINSON, Treatise on Mal., 1840, p. 270, figs. 52, 53.

Mississippi drainage generally except its western portion; Alabama and Tombigbee rivers; northeast Texas?.

†QUADRULA GLOBATA Lea.

* *Unio globatus* LEA, Pr. Ac. N. Sci. Phila., I, 1871, p. 191; * Jl. Ac. N. Sci. Phila., VIII, 1874, p. 5, pl. I, fig. 1; * Obs., XIII, 1874, p. 9, pl. I, fig. 1.—* B. H. WRIGHT, Check List, 1888.

Holston and Tennessee rivers, Tennessee; Etowah River, Georgia.

(Group of *Quadrula glandacea*.[1])

Shell rhomboid-oval, nearly straight below and slightly biangulate behind, with a well-defined double posterior ridge; beaks probably full; surface slightly and irregularly sulcate; epidermis wrinkled, tawny; hinge strong, the plate somewhat flattened; pseudocardinals triangular; laterals strong, secondary lateral of right valve well developed; beak cavities deep, compressed; muscle scars very deep, smooth; nacre dirty straw color.

†QUADRULA GLANDACEA Lea.

* *Unio glandaceus* LEA, Pr. Ac. N. Sci. Phila., V, 1861, p. 59; *Jl. Ac. N. Sci. Phila., V, 1862, p. 77, pl. IX, fig. 226; * Obs., VIII, p. 81, pl. IX, fig. 226.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *glandaceus* LEA, Syn., 1870, p. 38.

Coosa and Cahawba rivers, Alabama.

[1] I am somewhat at a loss to know where to place this group. The very limited amount of material I have seen is in a badly eroded condition. I can form no idea of the beak sculpture, and I have never seen the soft parts. The texture and coloring of all the shells I have seen are like those of *Pleurobema*, but the very deep beak cavities and the general form are like *Quadrula*.

Section PACHYNAIAS Crosse and Fischer, 1893.

(Type, *Unio spheniopsis* Morelet.)

Shell elongate-triangular, inflated, truncated above and rounded below in front, straight on the base, with a high, sharp posterior ridge; the post base slightly biangulate; beaks full, the sculpture consisting of apparently faint ridges which run parallel with the growth lines; whole surface distinctly concentrically ridged; epidermis without rays; pseudocardinals solid, stumpy, somewhat radiate, roughened; beak cavities rather deep; muscle scars deep, smooth; nacre bluish white, thicker in front.

Animal unknown.

†QUADRULA SPHENIOPSIS Morelet.

* *Unio spheniopsis* MORELET, Test. Nov., I, 1849, p. 29.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 583, pl. LXI, figs. 2, 2*a*, 2*b*.

Rio Usumacinta, Guatemala.

†QUADRULA RUGOSOSULCATA Lea.

* *Unio rugososulcatus* LEA, Pr. Ac. N. Sci. Phila., X, 1866, p. 33; * Jl. Ac. N. Sci. Phila., VI, 1868, p. 266, pl. XXXIV, fig. 81; * Obs., XII, 1869, p. 26, pl. XXXIV, fig. 81.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *rugososulcatus* LEA, Syn., 1870, p. 35.

Central America.

Subgenus ROTUNDARIA (Rafinesque, 1820) Simpson.

(Type, *Obliquaria tuberculata* Rafinesque.)

Shell rounded or quadrate, slightly truncate above in front; posterior ridge low; beaks prominent, curved inward and forward over a strongly marked lunule; beak sculpture consisting of numerous (20 to 30) fine, irregular, broken, somewhat concentric corrugations which extend well on to the second year's growth and gradually blend with the regular sculpture; posterior three-fifths of the shell tuberculate; epidermis brown; beak cavities very deep, compressed; nacre violet.

Animal having the gills very large, inner very much wider in front, free the whole length from the abdominal sac; branchial opening immense, with many small papillae; anal opening very large, smooth; superanal opening not at all closed below.[1]

(Group of *Quadrula tuberculata*.)

Shell rounded, truncated behind, with a wide depression down the post slope.

[1] I regret that I have never been able to see gravid specimens of either of the species placed here. They are generally placed with the *pustulosus* group, but the strongly developed sulcus on the posterior slope and the very remarkable beak sculpture, which is not at all like that of any of our species, are good distinguishing characters. The enormous anal and branchial openings, and the open superanal opening are characters of some value.

†QUADRULA TUBERCULATA Rafinesque.[1]

* *Obliquaria* (*Rotundaria*) *tuberculata* RAFINESQUE, Ann. Gen. Sci. Brux., V, 1820, p. 103.—* CHENU, Bib. Conch., 1st ser., III, 1845, p. 20.
* *Rotundaria tuberculata* AGASSIZ, Arch. für Naturg., I, 1852, p. 48.
* *Unio tuberculatus* CONRAD, New F. W. Shells, 1834, p. 72.—* SAY, Am. Conch., VI, 1834.—* FERUSSAC, Guer. Mag., 1835, p. 28.—* CONRAD, Monog., V, 1836, p. 43, pl. XXII.—* KUSTER, Conch. Cab. Unio, 1852, p. 45, pl. IX, fig. 1.—* REEVE, Conch. Icon., XVI, 1864, pl. III, figs. 9, 12.
* *Unio verrucosus* BARNES, Am. Jl. Sci., VI, 1823, p. 123, pl. V, fig. 6.—* SHORT and EATON, Transylvania Jl., 1831, p. 75.—* HANLEY, Test. Moll., 1842, p. 180; * Biv. Shells, 1843, p. 180, pl. XXI, fig. 24.—* CATLOW and REEVE, Conch. Nom., 1845, p. 65.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 496.—* CALKINS, Pr. Ottawa Acad. Sci., 1874, p. 46.—* B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 171.
* *Margarita* (*Unio*) *verrucosus* LEA, Syn., 1836, p. 16; 1838, p. 15.
* *Margaron* (*Unio*) *verrucosus* LEA, Syn., 1852, p. 22; 1870, p. 34.
* *Unio verrucosus purpureus* HILDRETH, Am. Jl. Sci., XIV, 1828, p. 281.
* *Mya verrucosa* EATON, Zool. Text Book, 1826, p. 216.
* *Quadrula verrucosa* BAKER, Moll. Chicago, Pt. 1, 1898, p. 85, pl. XXIII.
* *Unio tuberculosa* VALENCIENNES, Rec. Obs. Zool. Anat., II, 1833, p. 232.

Mississippi drainage generally; southern Michigan; San Saba County, central Texas.

†QUADRULA GRANIFERA Lea.[2]

* *Unio graniferus* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 69, pl. XIX, fig. 60; * Obs., II, 1838, p. 69, pl. XIX, fig. 60.—* TROSCHEL, Arch. für Naturg., V, 1839, Pt. 2, p. 237.—* HANLEY, Test. Moll., 1842, p. 180; * Biv. Shells, 1843, p. 180, pl. XXIII, fig. 11.—* CATLOW and REEVE, Conch. Nom., 1845, p. 59.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 250.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 496.—* CHENU, Ill. Conch., 1858, pl. XXV, figs. 3, 3*a*, 3*b*.—* KUSTER, Conch. Cab. Unio, 1861, p. 212, pl. LXX, fig. 4.—* REEVE, Conch. Icon., XVI, 1864, pl. IX, fig. 34.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 154.
* *Margarita* (*Unio*) *graniferus* LEA, Syn., 1838, p. 15.
* *Margaron* (*Unio*) *graniferus* LEA, Syn., 1852, p. 22; 1870, p. 34.

†QUADRULA GRANIFERA var. PUSILLA Simpson.[3]

Ohio, Cumberland, and Tennessee river systems; northwest to Iowa.

[1] Rafinesque's description is plainly that of one of the pustulous Uniones of the Ohio, and the statement that it is truncated posteriorly, wants nodules anteriorly, is three or more inches long, and has a violet nacre makes it certain that it is the *verrucosus* of Barnes.

[2] This form has been considered by many merely at best a variety of the *tuberculata*, and I have so regarded it. It has always a smaller and generally a more inflated shell, higher beaks, and usually a smoother, more olive-colored epidermis than the latter. Its nacre is ordinarily more copper colored than that of *tuberculata*. I believe with Mr. Wetherby that it is a valid species.

[3] A greatly dwarfed inflated form from the Green River at Mammoth Cave, Kentucky, may bear the above name.

(Group of *Quadrula ostreata*.)

Shell rhomboid, incurved on the base, with a well-developed posterior ridge, somewhat biangulate behind; beak sculpture consisting of a number of fine, concentric ridges showing a tendency to be doubly looped, which gradually change, first to corrugations and then to pustules; pseudocardinals ragged, secondary lateral of right valve but slightly developed.

Animal unknown.

†QUADRULA OSTREATA Morelet.

* *Unio ostreatus* MORELET, Test. Noviss., No. 1, 1849, p. 29.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 573, pl. LXIII, fig. 3; LXX, fig. 4.

Rio Usumacinta, Guatemala.

†QUADRULA USUMASINTÆ Crosse and Fischer.

* *Unio usumasintæ* CROSSE and FISCHER, J. de Conch., XL, 1892, p. 294.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 574, pl. LXIII, fig. 4; LXVII, fig. 5.

Rio Usumacinta, Guatemala.

†QUADRULA GUATEMALENSIS Simpson.

* *Quadrula guatemalensis*, SIMPSON, Pr. Acad. N. Sci. Phila., 1900, p. 83, pl. II, fig. 4.

Rio Usumacinta, Guatemala.

(Group of *Quadrula percompressa*.)

Shell large, triangular to rhomboid, greatly compressed throughout, with a low posterior ridge and a slight secondary ridge above it, making the shell slightly biangulate posteriorly; beaks very prominent, flattened; beak sculpture not seen; surface of the disks covered with rather fine, somewhat lachrymose nodules, corrugate wrinkled on the posterior slope;[1] cavity of the beaks enormously deep and compressed; area outside the palleal line wide in front; shell thickened anteriorly.

†QUADRULA PERCOMPRESSA von Martens.

* *Unio percompressus* VON MARTENS, Sitzungs Ber. Nat. Tr. 1887, p. 107.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 576; Biologia Cent-Am. Mollusca, 1900, p. 496, pl. XXXII, figs. 1–3.

Rio de las Salinas, Guatemala.

Subgenus LAMPROTULA Simpson, 1900.

(Type, *Chama plumbea* Chemnitz.)

Shell rounded to triangular, inflated, with high beaks; beak sculpture consisting of a few coarse, subparallel ridges which are slightly doubly

[1] Only two left valves of this remarkable species have been seen by the writer, both of which curve to the left in front and to the right behind. It is probable that others may turn to the right, and von Martens' shells are flat.

looped; surface of the shell generally covered with coarse nodules or knobs; posterior slope radially ridged; epidermis dark; two strong laterals in each valve, all vertically striated; cavity of the beaks deep and compressed; nacre mostly whitish, usually radially granularly striated outside the pallial line, having one or more peculiar calluses behind and below the laterals which are iridescent and granularly striate.

Animal unknown.[1]

(Group of *Quadrula plumbea*.)

Shell rounded, slightly angulated behind the ligament, solid, moderately inflated, covered with coarse pustules, and having broken, upcurved corrugations on the posterior slope; epidermis light brownish; hinge rather strong, somewhat flattened; laterals vertically striated.[2]

QUADRULA PLUMBEA Chemnitz.

**Chama plumbea* CHEMNITZ, Conch. Cab., XI, 1795, p. 237, pl. CCIII, figs. 1991, 1992.—*DILLWYN, Cat. I, 1817, p. 215.—*WOOD, Ind. Test. Rev., 1856, p. 52, pl. IX, fig. 6.

Unio plumbeus FERUSSAC, Guer. Mag., 1835, p. 28.—*KUSTER, Conch. Cab. Unio., 1862, p. 289, pl. XCVII, figs. 1, 2.

South East Asia, probably. The locality, "South Sea," given by Chemnitz is, no doubt, erroneous.

†QUADRULA COREANA von Martens.

**Unio coreanus* VON MARTENS, S. B. Nat. Fr., 1886, p. 78.—*PÆTEL, Conch. Sam., III, 1890, p. 149.

Söul, Korea.

(Group of *Q. nodulosa*.)

Shell very solid, oval or rounded, inflated, inequilateral, inequivalve, the valves more or less twisted on their axis or having the appearance as if one of them had been pushed forward on the other, so that a dorsal view shows the outline to be rhomboid; each valve with a posterior ridge, that on the valve pushed forward less developed; beaks high, full, apparently sculptured with a few coarse irregular ridges; posterior slope usually having strong, radiating, upcurved ridges; hinge plate generally wide and flattened; pseudocardinals heavy, somewhat radiate, often with the sockets evenly, radially grooved; laterals strong, heavily vertically ridged; secondary lateral of right valve well developed,

[1] A group of peculiar and striking species which presents a number of quite diverse forms. On account of this diversity, the fact that the beak sculpture is rarely preserved, and that nothing is known of the anatomy, the group is a difficult one to arrange.

[2] A single, rather young, dead, and somewhat decayed specimen of what I believe is *Q. coreana*, from Söul, Korea, belonging to the collection of F. Stearns has been examined by the writer. The *Chama plumbea* of Chemnitz seems to be near it, but is solider and shorter.

anterior cicatrices small, deep, posterior shallow; cavity of the beaks enormously deep, compressed; dorsal cicatrices on the under side of the shelf.

Animal unknown.

†QUADRULA TORTUOSA Lea.

* *Unio tortuosus* LEA, Pr. Ac. N. Sci. Phila., IX, 1865, p. 76; * Jl. Ac. N. Sci. Phila., VI, 1868, p. 286, pl. XXXIX, fig. 98; * Obs., XII, 1869, p. 46, pl. XXXIX, fig. 98.

* *Margaron* (*Unio*) *tortuosus* LEA, Syn., 1870, p. 30.

† * *Unio* (*Lampsilis*) *subtortus* BAIRD and ADAMS, Proc. Zool. Soc. Lond., 1867, p. 491, pl. XXVI, figs. 1, 1*a*.

* *Unio subtortus* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXVII, fig. 465.—* HEUDE, Conch. Fluv. Nank., VIII, 1883, pl. LXI, fig. 119.—* PÆTEL, Conch. Sam., III, 1890, p. 169.

* *Unio retortus* HEUDE, Conch. Fluv. Nank., VIII, 1883, pl. LVII, fig. 109.—* PÆTEL, Conch. Sam., III, 1890, p. 165.

China.

†QUADRULA TIENTSINENSIS Crosse and Debeaux.

* *Unio tientsinensis* CROSSE and DEBEAUX, Jl. de Conch., III, 1863, p. 257, pl. X, fig. 1.—* SOWERBY, Conch. Icon., XVI, 1868, pl. XCI, fig. 514, 514*a*, 514*b*.—* PÆTEL, Conch. Sam., III, 1890, p. 169.

* *Margaron* (*Unio*) *tientsinensis* LEA, Syn., 1870, p. 30.

China.

QUADRULA ZONATA Heude.

* *Unio zonatus* HEUDE, Conch. Fluv. Nank., VIII, 1883, pl. LXI.—* PÆTEL, Conch. Sam., III, 1890, p. 172.

* *Unio tientsinensis* HEUDE, Conch. Fluv. Nank., VIII, 1883, pl. LX, fig. 118.

China.

†QUADRULA FIBROSA Heude.

* *Unio fibrosus* HEUDE, Conch. Fluv. Nank., II, 1877, pl. XL, fig. 22.[1]—* PÆTEL, Conch. Sam., III, 1890, p. 152.

* † *Unio spurius* HEUDE, Conch. Fluv. Nank., II, 1877, pl. XI, fig. 22.—* PÆTEL, Conch. Sam., III, 1890, p. 168.

China.

†QUADRULA NODULOSA Wood.

* *Mya nodulosa* WOOD (part), Gen. Conch., I, 1815, p. 106, pl. XXII, figs. 1, 2.[2]—* DILLWYN, Catalogue I, 1817, p. 52.—* WOOD, Index Test, 1825, p. 12, pl. II, fig. 29*b*; * Index Test. Rev., 1856, p. 16, pl. II fig. 29.

* *Unio nodulosus* HANLEY, Test. Moll., 1842, p. 180.—* Biv. Shells, 1843, p. 180.—* CATLOW and REEVE, Conch. Nom., 1845, p. 61.—* H. and A. ADAMS, Gen.

[1] Doubtfully distinct from *zonata*.

[2] Wood gives four figures; the first and second being a solid, nodulous, Chinese species; the third and fourth seem to be *Unio pictorum*. Lamarck used the name *nodulosa* for a *Unio* (An. sans Vert., VI, 1819, p. 78), and refers to the Encyclopedie Méthodique, 1797, pl. 248, fig. 19, and this figure is no doubt that of *Unio pictorum*. Wood seems to have confounded the two.

Rec. Moll., II, 1857, p. 496.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXIII, fig. 439.—* PÆTEL, Conch. Sam., III, 1890, p. 161.

* *Margarita* (*Unio*) *nodulosus* LEA, Syn., 1836, p. 16; 1838, p. 15.

* *Margaron* (*Prisodon*) *nodulosus* LEA, Syn., 1852, p. 27; 1870, p. 27.

* *Castalia nodulosa* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 509.

† *Unio grandidens* LEA,[1] Pr. Ac. N. Sci. Phila., V, 1862, p. 168; * Jl. Ac. N. Sci. Phila., V, 1862, p. 205, pl. XXX, fig. 274; * Obs., IX, 1863, p. 27, pl. XXX, fig. 274.

* *Margaron* (*Unio*) *grandidens* LEA, Syn., 1870, p. 34.

China.

QUADRULA KOUANGENSIS Simpson.[2]

* *Unio moreletianus* HEUDE, Conch. Fluv. Nank., VIII, 1883, pl. LX, fig. 117.—* PÆTEL, Conch. Sam., III, 1890, p. 160.

Kouang-te-tcheou, China.

†QUADRULA POLYSTICTO-SCRIPTUS Heude.

* *Unio polysticto-scriptus* HEUDE, Conch. Fluv. Nank., II, 1877, pl. XIII, fig. 26.—* PÆTEL, Conch. Sam., III, 1890, p. 164.

* *Unio scripto-polystictus* HEUDE,[3] Conch. Fluv. Nank., II, 1877, pl. XIII, fig. 27.

* *Unio scripto-polystrictus* PÆTEL, Conch. Sam., III, 1890, p. 167.

China.

†QUADRULA POLYSTICTUS Heude.

* *Unio polystictus* HEUDE, Conch. Fluv. Nank., II, 1877, pl. XII, fig. 25.—* PÆTEL, Conch. Sam., III, 1890, p. 164.

China.

†QUADRULA SIMILARIS Simpson.

* *Unio affinis* HEUDE, Conch. Fluv. Nank., I, 1875, pl. III, figs. 7, 7*a*.[4]—* PÆTEL, Conch. Sam., III, 1890, p. 144.

China.

†QUADRULA MICROSTICTIS Heude.

* *Unio microstictis*, HEUDE, Conch. Fluv. Nank., II, 1877, pl. XII, fig. 24; * Jahrb. Deutsch. Mal. Ges., VIII, 1881, p. 122.—* PÆTEL, Conch. Sam., III, 1890, p. 159.

China.

(Group of *Quadrula rochechouarti*.)

Shell rhomboid, with a strong posterior ridge, rounded before, incurved below, and somewhat biangulate on the posterior base, with very strong folds on posterior slope which begin on the posterior ridge as

[1] A single valve (the type) is in the Lea collection, and an opposing matched valve is in that of the U. S. National Museum. Dr. Lea states that they were obtained near Hot Springs, Arkansas, by Major Byrd Powell. I am certain this is a mistake, and that it is a Chinese species. It agrees exactly with Wood's figure of *nodulosa*, is slightly pushed over or twisted on its axis, and has the vertically ridged laterals characteristic of the heavy Chinese forms very strongly developed.

[2] Heude's name *moreletianus* has been twice preoccupied.

[3] Believed by Heude to be a hybrid with *polysticto-scriptus*. I can not see that the two differ sufficiently to be separated.

[4] The name *affinis* was used long before by Dr. Lea for a *Unio*.

knobs; surface strongly pustulous; beaks rather well forward, sculpture not seen; epidermis concentrically wrinkled, black and rough; pseudocardinals strong, somewhat radial, rough, striate; laterals more or less vertically striate, secondary lateral in right valve well developed; beak cavities very deep, compressed; posterior calluses faint.

Animal unknown.

†QUADRULA ROCHECHOUARTI Heude.

* *Unio rochechouarti* HEUDE, Conch. Fluv. Nank., I, 1875, pl. v, fig. 13; *Jahrb. Deutsch. Mal. Ges., VIII, 1881, p. 122.—*PÆTEL, Conch. Sam., III, 1890, p. 165.

China.

(Group of *Quadrula triclava.*)

Shell solid, elongate triangular, obtusely pointed at the posterior base, with a decided posterior ridge, along which runs a row of ponderous knobs; beaks high and far forward; surface strongly nodulous; posterior slope slightly corrugated; epidermis dark chestnut; pseudocardinals heavy, subradial, radially striate; laterals vertically striate, secondary lateral of right valve well developed; cavity of the beaks enormously deep and compressed; a granular callus behind the laterals; nacre silvery, radially granularly striate outside the pallial line.

†QUADRULA TRICLAVA Heude.

* *Unio triclarus* HEUDE, Conch. Fluv. Nank., II, 1877, pl. x, figs. 21, 21*a*.—*PÆTEL, Conch. Sam., III, 1890, p. 170.

China.

(Group of *Quadrula bazini.*)

Shell elongate-trigonal, with a fairly well developed posterior ridge, pointed behind; beaks not high, almost at extreme front of the shell; surface more or less covered with knobs and tubercles, which show a tendency to an arrangement in curved lines; epidermis chestnut to blackish; hinge strong; pseudo-cardinals radial, radiately striate; laterals granular, showing traces of vertical striation; beak cavities very deep, compressed; nacre silvery.

Animal unknown.

†QUADRULA BAZINI Heude.

* *Unio bazini* HEUDE, Conch. Fluv. Nank., II, 1877, pl. IX, fig. 20.—* PÆTEL, Conch. Sam., III, 1890, p. 145.

China.

(Group of *Quadrula leai.*)

Shell obovate, obtusely pointed behind; posterior ridge low; whole surface generally tuberculate or knobbed, with strong, radial, curved

ridges on the posterior slope; beaks rather low, the sculpture coarse, irregular, broken bars, somewhat doubly looped and swollen on the posterior ridge, with strong, radiating ridges behind them; pseudocardinals solid, often compressed in the direction of the axis of the shell; laterals granular; beak cavities moderately deep; one or more granular calluses behind the laterals; nacre white or lurid, slightly radially granular outside the pallial line.

Animal unknown.

†QAUDRULA LEAI Gray.

* *Unio leai* GRAY, Griff. Cuvier, XII, 1834, p. 600 (index), pl. XXI, fig. 1.[1]—* CATLOW and REEVE, Conch. Nom., 1845, p. 60.—* BENSON, Jl. As. Soc. Calcutta, XXIV, 1855, p. 136 (p. 18, reprint).—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 496.—* KUSTER, Conch. Cab. Unio, 1861, p. 232, pl. LXXVIII, fig. 3.—* ? HEUDE, Conch. Fluv. Nank., I, 1875, pl. IV, fig. 10, pl. VI.—* GREDLER, Jahrb. Deutsch, Mal. Ges., VIII, 1881, p. 122.—* VON MARTENS, Sitzber. Nat. Fr., 1885, p. 77.—* P.ETEL, Conch. Sam., III, 1890, p. 157.

* *Margarita* (*Unio*) *leaii* LEA, Syn., 1836, p. 17; 1838, p. 16.

* *Margaron* (*Unio*) *leaii* LEA, Syn., 1852, p. 23; 1870, p. 34.

* *Unio leeai* HANLEY, Biv. Shells, 1843, p. 182, pl. XXIII, fig. 55.

* *Unio nodulosus* REEVE, Conch. Icon., XVI, 1864, pl. IX, fig. 32.

†QUADRULA LEAI var. LELECI Heude.

* *Unio leleci* HEUDE, Conch. Fluv. Nank, I, 1875, pl. IV, fig. 12; V, fig. 14.—GREDLER, Jahrb. Deutsch, Mal. Ges., VIII, 1881, p. 122.

* *Unio richthofeni* VON MARTENS, S. B. Nat. Fr. 1875, p. 3; Mal. Blatt, XII, 1875, p. 187; Nov. Conch., IV, 1876, p. 156, pl. CXXXVI, figs. 1-3.—[2]* P.ETEL, Conch. Sam., III, 1890, p. 165.

* *Unio leai* var. *leleci* P.ETEL, Conch. Sam., III, 1890, p. 157.

China; Tonkin; Mekong River.

QUADRULA OVATA Simpson.

Unio vestitus var. *a* HEUDE, Conch. Fluv. Nank., VIII, 1883, pl. LVIII, fig. 112; LIX, fig. 116.[3]

QUADRULA CAVEATA Heude.

* *Unio careatus* HEUDE, Conch. Fluv. Nank., III, 1877, pl. XXIV, fig. 53.—* P.ETEL, Conch. Sam., III, 1890, p. 147.

* *Unio contritus* HEUDE, Conch. Fluv. Nank., VII, 1881, pl. LVI, fig. 103.—* P.ETEL, Conch. Sam., III, 1890, p. 148.

* *Unio quadrangulosus* HEUDE, Conch. Fluv. Nank., VII, 1881, pl. LVI, fig. 104.—* P.ETEL, Conch. Fluv. Nank., III, 1890, p. 164.

China.

[1] A very brief description is given in the index.

[2] Von Martens, in a note at the close of Vol. IV, places his species in the synonymy of *U. leleci* Heude. I am satisfied that *leleci* is but a variety of *U. leai* Gray.

[3] Heude's name is preoccupied by Lea for a *Unio*, I therefore change it as above.

†QUADRULA CORNUUM LUNÆ Heude.[1]

* *Unio montanus* HEUDE, Conch. Fluv. Nank., I, 1875, pl. IV, fig. 11.—* PÆTEL, Conch. Sam., III, 1890, p. 159.

* *Unio cornuum-lunæ* HEUDE, Conch. Fluv. Nank., VIII, 1883, pl. LVII, fig. 105.—* PÆTEL, Conch. Sam., III, 1890, p. 149.

* *Unio trisulcatus* HEUDE, Conch. Fluv. Nank., VIII, 1883, pl. LVII, fig. 108.

* *Unio paschalis* HEUDE, Conch. Fluv. Nank., VIII, 1883, pl. LVIII, fig. 110.—* PÆTEL, Conch. Sam., III, 1890, p. 162.

* *Unio verruculosus* HEUDE, Conch. Fluv. Nank., VIII, 1883, pl. LVIII, fig. 111.—* PÆTEL, Conch. Sam., III, 1890, p. 171.

* *Unio abortivus* HEUDE, Conch. Fluv. Nank., VIII, 1883, pl. LXIII, fig. 124.

* *Unio monticola* HEUDE, Jl. de Conch., XXXII, 1884, p. 19.

QUADRULA CORNUUM LUMÆ var. CINNAMOMEUS Gredler.

* *Unio leai* var. *cinnamomeus* GREDLER, Jahrb. Deuts. Mal. Ges., VIII, 1881, p. 122, pl. VI, fig. 16.[2]—* PÆTEL, Conch. Sam., III, 1890, p. 157.

China.

QUADRULA SCRIPTA Heude.

* *Unio scriptus* HEUDE, Conch. Fluv. Nank., I, 1875, pl. III, figs. 8, 8*a*.—* PÆTEL, Conch. Sam., III, 1890, p. 167.

China.

QUADRULA DIVERGENS Benson.

Unio divergens BENSON, Jl. As. Soc. Beng., XXIX, 1855, p. 137.[3]

Chusan Island, China.

Subgenus DISCOMYA Simpson, 1900.

Shell subsolid, round obovate or subrhomboid, lenticular, rather compressed, widely, faintly biangulate behind, with scarcely any vestige of a posterior ridge; beaks very low, sculpture not seen; front half of the shell densely covered with fine pustules arranged in curved rows in two directions as if engine chased, over which the epidermis is wrinkled. The hinder half is covered with fine, radiating and undulating corrugations, curved upward posteriorly, which are slightly nodulous and show through on the inside of the shell; one slightly compressed pseudocardinal in the right valve and two in the left; one delicate, curved

[1] First called *montanus* by Heude, which was several times preoccupied in *Unio*.

[2] Gredler makes this a variety of *leai*, but I believe it is a rather finely sculptured form of *monticola*. The species varies much in the size of pustules and the degree of its smoothness, and Heude has exalted all these variations to the rank of species. I think it probable that when a large amount of material can be examined it will be found necessary to reduce some of the Chinese forms I have considered as species to the rank of varieties, or even to the synonymy.

[3] Benson says this is not very distantly related to *Unio undulatus* Barnes. It has never been figured, so far as I know, but from all I can learn of it it belongs in this group and may be *Q. leai*.

lateral in the right valve and two in the left; beak cavities deep, compressed; nacre lurid; palleal line showing a slight posterior sinus.[1]

(Type, *Unio radulosus* Drouet and Chaper.)

†QUADRULA RADULOSA Drouet and Chaper.

* *Unio radulosus* DROUET and CHAPER, Mem. Soc. Zool. Fr., V, 1892, p. 150, pl. v, figs. 10–12.—* Jl. de Conch., XLI, 1893, p. 41.

†QUADRULA RADULOSA var. RHOMBOIDEA Simpson.[2]

Borneo.

The relationship of the following is uncertain.

UNIO NEWENHUISI Schepman.

* *Unio newenhuisi* SCHEPMAN, Notes Leyd. Mus., XX, 1898, p. 92, pl. I, figs. 1, 2.—* DROUET, Jl. de Conch., 1899, p. 406.

Borneo.

May be related to *Unio radulosus* Drouet and Chaper.

Genus SHISTODESMUS Simpson, 1900.

(Type, *Unio lampreyanus* Baird and Adams.)

Shell rather solid, triangular, inflated, truncate above in front, somewhat swollen just behind the center of the base, pointed behind; beaks high; beak sculpture not seen; surface thrown up into strong, very wide, concentric ridges, one or two with each season's growth, and pinched up in the central part to form a radiate row of compressed knobs or spines; epidermis shining, greenish-yellow or brownish, having marvelously delicate, concentric, microscopic liræ, often painted with a few elegant, broken, green rays; there is one large, high, triangular pseudocardinal in the left valve under the beak, a deep, triangular pit in front of it, with an erect, radial lamellar tooth in its center, and a high, lamellar, curved tooth in front of the pit, parallel with the edge of the shell connected with the central tooth. A heavy triangular bifid or trifid pseudocardinal in the right valve stands close to the anterior edge of the shell and is separated from it by a deep, compressed pit; behind this tooth, deep down at its base, is a narrow shelf, and back of this the entire hinge plate is cut out in a deep sinus to the beak; two laterals in each valve; cavity of the beak in left valve deep, somewhat compressed; in the right entirely opened by the sinus; muscle scars small, deep, smooth; pallial line with a sinus at its posterior end; a

[1] I know nothing of the anatomy of this curious *Naiad*, which seems to show some relation to such species as *Quadrula microstictus* and related forms. I place it in *Quadrula* with doubt.

[2] There is a specimen in the U. S. National Museum marked *Unio radulosus* Drouet and Chaper, from Borneo, which is quite rhomboid and but slightly sculptured on the body, though it is plicate behind, which may bear the above name. It is probably a valid species.

beautiful, granularly striate callus is developed behind the laterals; nacre finely, often bifurcately radiate striate outside the parallel line.

Animal unknown.

† SHISTODESMUS LAMPREYANUS Baird and Adams.

* *Unio (Dysnomia) lampreyanus*, BAIRD and ADAMS, Proc. Zool. Soc. Lond., 1867, p. 491, pl. XXVI, figs. 2, 2*a*.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXVII, fig. 469.—* HEUDE, Conch. Fluv. Nank., VII, 1883, pl. LIX, figs. 114, 114*a*, 114*b*.—* PÆTEL, Conch. Sam., III, 1890, p. 156.

Margaron (Unio) lampreyanus LEA, Syn., 1870, p. 30.

SHISTODESMUS SPINOSUS Simpson.

Unio restitus var. *β*, HEUDE, Conch. Fluv. Nank., VIII, 1883, pl. LIX, fig. 115.[1]

Genus GIBBOSULA Simpson, 1900.

(Type, *Mya crassa* Wood.)

Shell very solid, inequilateral, triangular-elliptical, arcuate, pointed behind, with a low, well-marked posterior ridge; beaks rather high; beak sculpture not seen; posterior two-thirds of the shell covered with somewhat radiating corrugations and nodules; posterior slope having strong subradial folds; epidermis dark; hinge plate very wide; pseudocardinals not large, stumpy, rough; laterals very heavy, club shaped; beak cavities enormously deep and compressed; anterior cicatrices rather shallow, rough in the bottom; posterior cicatrices deep and distinct; a strong rib runs from the front part of the beak cavity toward the posterior base; nacre whitish.

Animal unknown.

† GIBBOSULA CRASSA Wood.

* *Mya crassa* WOOD, Gen. Conch., 1815, p. 106, pls. XX, XXI;[2] * Ind. Test., 1825, p. 12, pl. II, fig. 28*b*; * Ind. Test. Rev., 1856, p. 16, pl. II, fig. 28.

* *Mya ponderosa* DILLWYN, Dill. Cat., I, 1817, p. 51.

* *Margarita Unio ponderosus* LEA, Syn., 1836, p. 14; 1838, p. 14.

* *Unio ponderosus* HANLEY, Test. Moll., 1842, p. 177; * Biv. Shells, 1843, p. 177.—* CATLOW and REEVE, Conch. Nom., 1845, p. 63.—* H. and A. Adams, Gen. Rec. Moll., II, 1857, p. 497.

* *Margaron (Unio) ponderosus* LEA, Syn., 1852, p. 21; 1870, p. 32.

China.

Genus CUNEOPSIS Simpson, 1900.

(Type, *Unio celtiformis* Heude.)

Shell solid, elongated, wide and truncate or rounded in front, tapering to a point behind; often twisted on its axis and curved to the right

[1] Heude made this a variety of his *Unio restitus* (which I have placed in *Quadrula*. I am satisfied that this is a *Shistodesmus* and distinct from *lampreyanus*, as it seems to have spines instead of knobs. His name *restitus* is preoccupied in *Unio* by Lea.)

[2] The name *crassus* had been previously applied to a *Unio* by Retzius, but as Wood's species was never placed in *Unio* under the specific name *crassus*, his name may be used.

or left; beaks rather high, anterior; beak sculpture apparently a few coarse, subparallel nodular ridges curved up behind; posterior ridge low, close to the hinge line, and in front of it the shell is full; surface slightly, irregularly, concentrically striate; epidermis dark, having a peculiar, dull, silky luster; hinge rather narrow; pseudocardinals two in the left valve immediately under the beak, the anterior compressed, high and nearly parallel with the outer edge of the shell, the posterior heavy, joined to the anterior above, with a deep, triangular cavity between; right valve with one large, triangular, anterior pseudocardinal with a deep, triangular pit back of it, and often a small, low, compressed tooth behind the pit; laterals granularly striate, beak cavities rather deep; anterior muscle scars deep, rough at the bottom; posterior scars large, long and oblique; nacre silvery, sometimes radially striate at the edge; palleal line indented into a sinus at its posterior end, above which is a granular, striate callus.

Animal unknown.

†CUNEOPSIS CAPITATUS Heude.

* *Unio capitatus* HEUDE, Jl. de Conch., XXII, 1874, p. 114; * Conch. Fluv. Nank., I, 1875, pl. II, fig. 5.—* P.ETEL, Conch. Sam., III, 1890, p. 147.

China.

†CUNEOPSIS HEUDEI Heude.

* *Unio heudei* HEUDE (Bazin manuscript), Jl. de Conch., XXII, 1874, p. 114.—* P.ETEL, Conch. Sam., III, 1890, p. 155.

* *Unio corderii* HEUDE, Conch. Fluv. Nank., I, 1875, pl. I, fig. 3.[1]—* P.ETEL, Conch., Sam., III, 1890, p. 149.

China.

†CUNEOPSIS CELTIFORMIS Heude.

* *Unio celtiformis* HEUDE, Jl. de Conch., XXII, 1874, p. 113; Conch. Fluv. Nank., I, 1875, pl. I, fig. 4.—* P.ETEL, Conch. Sam., III, 1890, p. 147.

China.

†CUNEOPSIS PISCICULUS Heude.

* *Unio pisciculus* HEUDE, Jl. de Conch., XXII, 1874, p. 115; *Conch. Fluv. Nank., I, 1875, pl. II, figs. 6, 6*a*.—* P.ETEL, Conch. Sam., III, 1890, p. 163.

* *Unio retortus* VON MARTENS, Sitzber. Ges. Nat. Fr., 1875, p. 4; *Mal. Blatt., XXII, 1875, p. 188; Nov. Conch., IV, 1876, p. 158, pl. CXXXVI, figs. 3, 4.[2]—*P.ETEL, Conch. Sam., III, 1890, p. 165.

China.

†CUNEOPSIS RUFESCENS Heude.

* *Unio rufescens* HEUDE, Jl. de Conch., XXII, 1874, p. 113; Conch. Fluv. Nank., I, 1875, pl. I, fig. 2.—* P.ETEL, Conch. Sam., III, 1890, p. 166.

China.

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[1] Changed to *corderi* by Heude in above reference.

[2] Von Martens places this in the synonymy of *U. pisciculus* in Vol. IV of the Novatites Conchologia.

Subfamily HYRIANÆ Swainson.

(ENDOBRANCHIÆ.)

Male and female shells alike, with beak sculpture radial or zigzag-radial; marsupium occupying the inner gills only.

(ROSANORHAMPHUS.)

Beak sculpture zigzag-radial.

Genus NODULARIA Conrad, 1853.

(Type, *Unio douglasiæ* Gray.[1])

Nodularia CONRAD, Pr. Ac. N. Sci. Phila., 1853, p. 268.

Shell elliptical to elongated, pointed behind about midway up from the base, the post-basal part produced; beak sculpture variable, irregularly zigzag-radial, often breaking into nodules, and extending in many cases over a part or all of the disk; right valve with two usually compressed pseudocardinals, one above the other, the lower the more elevated, separated by a parallel-sided socket, and having one lateral; left valve with two compressed pseudocardinals, both in front of the beaks, and two laterals; cavity of the beaks moderate, not compressed, anterior muscle scars deep, posterior shallow, nacre white.

Animal (of *N. japanensis* and *N. æquitoria*) having the inner gills alone filled throughout their entire length with ova, forming a pad-like marsupium, united to the abdominal sac or free from it.

Section LANCEOLARIA Conrad, 1853.

(Type, *Unio grayanus* Lea.)

Shell ensiform, solid, with a distinct, pinched-up posterior ridge, rounded in front, the posterior end sharp and generally turned a little to the right or left; beaks low, their sculpture nodulous, zigzag, often extending more or less over the surface; pseudocardinals rather stumpy, ragged, striate above, smooth below; anterior muscle scars distinct, the upper round, very deep, appearing as if bored out.

Animal unknown.

† NODULARIA GRAYANA Lea.

* *Unio grayanus* Lea, Tr. Am. Phil. Soc., V, 1834, p. 66, pl. IX, fig. 26; Obs., I, 1834, p. 178, pl. IX, fig. 26.—* REEVE, Conch. Syst., I, 1841, p. 118, pl. LXXXVIII, fig. 4.—* HANLEY, Test. Moll., 1842, p. 177; Biv. Shells, 1843, p. 177, pl. XXIV, fig. 5.—* CATLOW and REEVE, Conch. Nom., 1845, p. 59.—† KUSTER, Conch. Cab. Unio, 1856, p. 167, pl. XLVIII, fig. 5.—* H. and A.

[1] A large genus of generally rather small species, very abundant in individuals, and distributed from the Amoor River throughout the mainland of all southeastern Asia and all of Africa except the region bordering on the Mediterranean. Some of the African species are so close to Asiatic forms of the *caruleus* group that they can hardly be separated specifically.

ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* CHENU, Man., 1859, II, p. 142, fig. 700.—* REEVE, Conch. Icon., XVI, 1865, pl. XXV, fig. 191.—* HEUDE, Conch. Fluv. Nank., II, 1877, pl. XVI, fig. 36.—* P.ETEL, Conch. Sam., III, 1890, p. 154.

* *Margarita* (*Unio*) *grayanus* LEA, Syn., 1838, p. 14.

* *Margaron* (*Unio*) *grayanus* LEA, Syn., 1852, p. 21; 1870, p. 32.

* *Unio grayii* GRIFFITH, Grif. Cuv., XII, 1834, pl. XXI, fig. 3.[1]

China.

†NODULARIA GLADIOLUS Heude.

* *Unio gladiolus* HEUDE, C. Fluv. Nank., II, 1877, pl. XVI, fig. 35.—* P.ETEL, Conch. Sam., III, 1890, p. 154.

China.

†NODULARIA TRIFORMIS Heude.

* *Unio triformis* HEUDE, Conch. F. Nank., II, 1877, pl. XVI, fig. 34.

* *Unio distortus* HEUDE, Conch. F. Nank., VIII, 1883, pl. LXII, figs. 122, 122*b*.—* P.ETEL, C. Sam., III, 1890, p. 151.

China.

†NODULARIA OXYRHYNCHUS von Martens.

* *Unio oxyrhynchus* VON MARTENS, Mal. Blatt, VII, 1861, p. 57.—* KOBELT, Abh. Senck. Nat. Ges., XI, 1879, p. 420, pl. XIII, figs. 3, 4.—* PFEIFFER, Nov. Conch., V, 1879, p. 192, pl. CLVII, figs. 4, 6.—* P.ETEL, C. Sam., III, 1890, p. 162.—* VON IHERING, Abh. Senck. N. Ges., XVIII, 1893, p. 156.

Japan.

Section **CYLINDRICA** Simpson, 1900.

(Type, *Nodularia cylindrica* Simpson.)

Shell inflated, solid, cylindrical, smooth, with a rounded posterior ridge; teeth heavy, pseudocardinals radiate, curved.

NODULARIA CYLINDRICA Simpson.

* *Unio grayanus* SCHRENCK,[2] Reis. und Forsch. im Am. Lande, 1867, p. 694, pl. XXVII, figs. 1–3.

Nodularia cylindrica SIMPSON, Pr. Ac. N. Sci. Phila., 1900, p. 84.

Amur land.

Section **NODULARIA** Conrad, 1853.

(Type, *Unio douglasiæ* Gray.)

Characters the same as the genus.

(Group of *Nodularia douglasiæ*.)

Shell olive to blackish, subsolid; surface generally more or less covered with nodules arranged in subradiating or chevron-shaped patterns.

[1] I have seen a curious shell in the collection of Mr. Bryant Walker shaped something like the *N. grayana*, but quite heavy and decidedly inflated in the post-basal region. It may be an old *grayana*, but is so eroded that I can not be certain.

[2] Schrenck supposes this to be the *Unio grayanus* of Lea, but it is very different. It is a large, heavy, cylindrical shell, apparently without sculpture, and the figure does not show plainly whether it has any posterior ridge. A large form between *grayanus* and *oxyrhynchus* is found in Korea, according to von Martens, Sitzber. Nat. Fr., 1885, p. 77.

†NODULARIA DOUGLASIÆ Gray.[1]

* *Unio douglasiæ* GRAY, Griff. An. King., XII, 1833, (p. 601 index, 1834), pl. XXI, fig. 2.—* PÆTEL, Conch. Sam., III, 1890, p. 151.

*† *Unio murchisonianus* LEA, Tr. Am. Phil. Soc., V, 1834, p. 33, pl. III, fig. 6; * Obs., I, 1834, p. 145, pl. III, fig. 6.—* HANLEY, Test. Moll., 1842, p. 177; * Biv. Shells, 1843, p. 177, pl. XXI, fig. 53.—* CATLOW and REEVE, Conch. Nom., 1845, p. 61.—* KUSTER, Conch. Cab. Unio, 1856, p. 166, pl. XLVIII, figs. 3, 4.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* CHENU, Man., 1859, II, p. 142, fig. 701.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXVIII, fig. 207.—* PÆTEL, Conch. Sam., III, 1890, p. 160.—* VON IHERING, Abh. Senck. Nat. Ges., XVIII, 1893, p. 159.

* *Margarita* (*Unio*) *murchisonianus* LEA, Syn., 1836, p. 14; 1838, p. 14.

* *Margaron* (*Unio*) *murchisonianus* LEA, Syn., 1852, p. 21; 1870, p. 32.

* *Unio osbecki* PHILIPPI, Zeits. für Mal., 1845, p. 164; * Conch., III, 1847, p. 45, pl. III, fig. 1.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* KUSTER, Conch. Cab. Unio, 1861, p. 236, pl. LXXIX, fig. 3.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXIX, fig. 353.—* PÆTEL, Conch. Sam., III, 1890, p. 162.

* *Margaron* (*Unio*) *osbecki* LEA, Syn , 1852, p. 21; 1870, p. 32.

*† *Unio nux-persicus* DUNKER, Zeits. für Mal., 1848, p. 83.[2]—* MUSGRAVE, Phot. Conch., 1863, pl. I, fig. 10.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXIII, fig. 373; * PÆTEL, Conch, Sam., III, 1890, p. 161.

* *Margaron* (*Unio*) *nux-persicus* LEA, Syn., 1870, p. 32.

*† *Unio wrightii* LEA, Pr. Ac. N. Sci., Phila., IX, 1865, p. 75; * Jl. Ac. N. Sci. Phila., VI, 1868, p. 283, pl. XXXIX, fig. 97; * Obs., XII, 1869, p. 43, pl. XXXIX, fig. 97.

* *Margaron* (*Unio*) *wrightii* LEA, Syn., 1870, p. 32.

* *Unio sculptus* DESHAYES, Bull. Nouv. Arch. Mus., IX, 1873, p. 9, pl. I, figs. 3, 3*a*.—* HEUDE, Conch. F. Nank., III, 1877, pl. XXIV, fig. 51.—* PÆTEL, Conch. Sam., III, 1890, p. 167.

* *Unio dactylinus* HEUDE, Conch. F. Nank., 1885, pl. LXV.[3]

* ? *Unio pictorum* var. *longirostris* WESTERLUND, Kong so. vet. Ak. Hand, XIV, No. 12, p. 74.[4]

Unio schrencki WESTERLUND. Where described?

Unio abbreviatus WESTERLUND. Where described?[5]

†NODULARIA DOUGLASIÆ var. SHANGHAIENSIS Lea.

* † *Unio shanghaiensis* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 153;[6] * Jl. Ac. N. Sci. Phila., IV, 1860, p. 242, pl. XXXVI, fig. 121; * Obs., VII, 1860, p. 60, pl. XXXVI, fig. 121.—* REEVE, Conch. Icon., XVI, 1865, pl. XXI, fig. 96.—* PÆTEL, Conch. Sam., III, 1890, p. 167.

* *Unio pictorum* var. *amurensis* MOUSSON, Jl. de Conch., XXXV, 1887, p. 26, pl. I, fig. 8.

[1] The plate in Griffith's Cuvier on which this species is figured bears date of 1833, and the names of the species are designated on it. The brief description (in the index) was published in 1834, the date of the work. Lea's *Unio murchisonianus* was not published until 1834. This species has an immense distribution and varies greatly in form and degree of sculpture.

[2] An author's shell in the Lea collection is certainly a young *U. douglasiæ*.

[3] This and *U. firmus* and *chloreus* with others are given as varietal names and lettered.

[4] Credited by Westerlund to Amurland. *Unio pictorum*, or varieties of it, have several times been credited to this region, but no doubt erroneously. This species is always darker when adult than the well-known European species, and has totally different beak sculpture. The two shells often resemble each other closely in form.

[5] Specimens of shells bearing the above names, labeled by Westerlund, are in the U. S. National Museum.

[6] A smooth form of *douglasiæ*, possibly worthy of a varietal name.

†NODULARIA DOUGLASIÆ var. NIPPONENSIS von Martens.[1]

[a] *Unio nipponensis* VON MARTENS, S. B. Nat. Fr., 1877, p. 119.—[b] KOBELT, Abh. Senck. Nat. Ges., XI, 1879, p. 422, pl. XII, fig. 3.—[c] PÆTEL, Conch. Sam., III, 1890, p. 161.—[d] VON IHERING, Abh. Senck. Nat. Ges., XVIII, 1893, p. 160.

China; Amurland; Japan.

†NODULARIA DORRI Wattebled.

[a] *Unio dorri* WATTEBLED Jl. de Conch., XXXIV, 1886, p. 71, pl. V, fig. 5.—[b] PÆTEL, Conch. Sam., III, 1890, p. 151.

Cochin China; Anam; Mekong river.

NODULARIA DIGITIFORMIS Sowerby.

[a] *Unio digitiformis* SOWERBY, Conch. Icon., XVI, 1868, pl. LXV, fig. 333.—[b] PÆTEL, Conch. Sam., III, 1890, p. 150.[2]

India.

(Group of *Nodularia japanensis.*)

Shell solid, elliptical, subrhomboid or oval, biangulate, rounded or pointed behind and often produced at the posterior base; posterior ridge low or scarcely developed; beaks moderately full; sculpture zigzag radial; surface of the valves concentrically striate or more or less covered with corrugated chevron-shaped sculpture which often becomes somewhat nodulous; epidermis greenish and sometimes rayed in young shells, becoming brown or blackish when adult.

Animal having the inner gills wider than the outer in front, equal behind, free from the abdominal sac throughout, united to the mantle to the extreme posterior point; palpi rather large, long; mantle double on the border and toothed below; branchial opening large, with well-developed, brown papillæ; anal opening large, with small tubercular papillæ on its inner edge, covered with wart-like papillæ inside; superanal opening not closed below.[3]

†NODULARIA JAPANENSIS Lea.

[a] *Unio japanensis* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 153; [b] Jl. Ac. N. Sci., Phila., IV, 1860, p. 244, pl. XXXVI, fig. 123; [c] Obs., VII, 1860, p. 62, pl. XXXVI, fig. 123.—[d] VON MARTENS, Mal. Bl., VII, 1861, p. 55.—[e] KUSTER, Conch. Cab. Unio, 1862, p. 227, pl. XCIII, fig. 4.—[f] SOWERBY, Conch. Icon., XVI, 1868, pl. LXXX, fig. 420.—[g] PÆTEL, Conch. Sam., III, 1890, p. 155.—[h] VON IHERING, Abh. Senck. Nat. Ges., XVIII, 1893, p. 157.

[a] *Margaron (Unio) japanensis* LEA, Syn., 1870, p. 31.

[1] Most of the Japanese forms of this species are smaller than those found on the mainland, though I have seen nothing that exactly agrees with Kobelt's figure. The ordinary form of *douglasiæ* is found also in Japan.

[2] This seems to stand between this group and that of *N. grayanus.*

[3] The shells of some of the species of this group are very different from the normal *Nodularia*, being covered with roughish epidermis and apparently lacking sculpture. Others, however, show occasional sculpture, and the young shells have the green epidermis characteristic of the group.

NODULARIA JAPANENSIS var. JOKOHAMENSIS von Ihering.

* *Unio japanensis* KOBELT Abh. Senck. Nat. Ges., XI, 1879, p. 423, pl. XII, figs. 1, 2.[1]
* *Unio yokohamensis* VON IHERING, Abh. Senck. Nat. Ges., XVIII, 1893, p. 158.

Japan.

†NODULARIA HACONENSIS von Ihering.

* *Unio haconensis* VON IHERING, Abh. Senck. Nat. Ges., XVIII, 1893, p. 161, fig. 3.

Japan.

NODULARIA BRANDTII Kobelt.

* *Unio brandtii* KOBELT, Abh. Senck. Nat. Ges., XI, 1879, p. 426, pl. XXIII, fig. 15.—* P.ETEL, Conch. Sam., III, 1890, p. 146.—* VON IHERING, Abh. Senck. Nat. Ges., XVIII, 1893, p. 157.[2]

Japan.

NODULARIA BIWÆ Kobelt.

* *Unio biwæ* KOBELT, Abh. Senck. Nat. Ges., XI, 1879, p. 425, pl. XXIII, figs. 2–4.—* PAETEL, Conch. Sam., III, 1890, p. 146.—* VON IHERING, Abh. Senck. Nat. Ges., XVII, 1893, p. 157.

Japan.

NODULARIA OMIENSIS von Heimburg.

* *Unio omiensis* VON HEIMBURG, Nach. Deuts. Mal. Ges., XVI, 1884, p. 93; * Jahrbuch Mal. Ges., XIV, 1887, p. 2, pl. I, figs. 2, 3.—* P.ETEL, Conch. Sam., III, 1890, p. 161.

Province of Omi, Japan.

(Group of *Nodularia reiniana.*)

Shell elliptical oval, very solid, truncated in front and somewhat biangulate behind, slightly produced at the posterior base; beak sculpture not known; pseudocardinals heavy, elongated, parallel with the dorsal line. Animal unknown.[3]

NODULARIA REINIANA Kobelt.

* *Unio reinianus* KOBELT, Abh. Senck. Nat. Ges., XI, 1879, p. 424, pl. XXIII, fig. 1.—* VON IHERING, Abh. Senck. Nat. Ges., XVIII, 1893, p. 157.

Japan.

(Group of *Nodularia sagittaria.*)

Shell elongated, the hinder point above the middle of the shell, with a sharp posterior ridge and a faint ridge above it; beaks rather low,

[1] Kobelt figured this for Lea's species, and it seems to me to be an old, solid, slightly arcuate form, possibly worthy of a varietal name.

[2] It is quite probable that this and the preceding species are only varieties of *N. japanensis.*

[3] The beaks of the specimen figured are greatly eroded. I can not be certain as to the relationship of this curious form, but it probably is a *Nodularia.*

their sculpture irregularly radial; disks finely concentrically striate, not otherwise sculptured; epidermis yellowish olive, cloth-like; pseudocardinals greatly elongated, compressed, sometimes dentellate under the beaks; laterals long, compressed. Animal unknown.

† NODULARIA SAGITTARIA Lea.

* *Unio sagittarius* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 93; *Jl. Ac. N. Sci. Phila., III, 1857, p. 298, pl. XXVI, fig. 12; * Obs., VI, 1857, p. 18, pl. XXVI, fig. 12.

* *Margaron* (*Unio*) *sagittarius* LEA, Syn., 1870, p. 58.

*† *Unio dugasti* MORLET, Jl. de Conch., XL, 1892, p. 86; * XLI, 1893, p. 156, pl. VI, fig. 4.[1]

Siam; Cambodia.

(Group of *Nodularia cærulea*.)

Shell elliptical, inflated, pointed about midway up behind, the postbasal region produced, with a well developed posterior ridge; beaks sculptured with numerous fine, radiating riblets, the central ones of which join below, the whole often more or less zigzagged and extending well over the disk; epidermis generally bluish green. Animal unknown.

† NODULARIA CÆRULEA Lea.

* *Unio cæruleus* LEA, Tr. Am. Phil. Soc., IV, 1831, p. 95, pl. XIII, fig. 25; *Obs , I, 1834, p. 105, pl. XIII, fig. 25.—*HANLEY, Test. Moll., 1842, p. 194; *Biv. Shells, 1843, p. 194, pl. XX, fig. 49.—*CATLOW and REEVE, Conch. Nom., 1845, p. 56.—*H. and A. ADAMS, Gen. Rec. Moll., II. 1857, p. 493.—*CHENU, Ill. Conch., 1858, pl. XVI, figs. 3, 3*a*, 3*b*.—*KUSTER, Conch. Cab. Unio, 1861, p. 228, pl. LXXVII, fig. 4.—*SOWERBY, Conch. Icon., XVI, 1866, pl. XLII, fig. 230.—*HANLEY and THEOBALD, Conch. Ind., 1876, p. 6, pl. XII, figs. 3, 3*a*.—*P.ETEL, Conch. Sam., III, 1890, p. 148.

* *Margarita* (*Unio*) *cæruleus* LEA, Syn., 1836, p. 26; 1838, p. 20.

* *Margaron* (*Unio*) *cæruleus* LEA, Syn., 1852, p. 30; 1870, p. 47.

* *Unio gerbidoni* EYDOUX, Guer. Mag., 1838, p. 9, pl. CXVIII, figs. 2, 2*a*, 2*b*.—*HANLEY and THEOBALD, Conch. Ind., 1876, p. 6, pl. XII, fig. 2.—* P.ETEL, Conch. Sam., III, 1890, p. 153.

*† *Unio substriatus* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 93; * Obs., VI, 1857, p. 20, pl. XXVI, fig. 14; *Jl. Ac. N. Sci. Phila., III, 1858, pl. XXVI, fig. 14.

* *Margaron* (*Unio*) *substriatus* LEA, Syn., 1870, p. 47.

*† *Unio humilis* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 93; *Obs., VI, 1857, p. 16, pl. XXVI, fig. 10; *Jl. Ac. N. Sci. Phila., III, 1858, p. 296, pl. XXVI, fig. 10.—* P.ETEL, Conch. Sam., III, 1890, p. 155.

* *Margaron* (*Unio*) *humilis* LEA, Syn., 1870, p. 32.

* *Unio corrianus* KUSTER, Conch. Cab. Unio, 1861, p. 229, pl. LXVII, fig. 5.

*† *Unio leioma* BENSON, Ann. and Mag., 1862, p. 192.—* HANLEY and THEOBALD, Conch. Ind., 1876, p. 6, pl. XII, fig. 6.—* P.ETEL, Conch. Sam., III, 1890, p. 157.

*† *Unio pilatus* LEA, Pr. Ac. N. Sci. Phila., X, 1866, p. 133; *Jl. Ac. N. Sci. Phila., VI, 1868, p. 281, pl. XXXVIII, fig. 95; * Obs., XII, 1869, p. 41, pl. XXXVIII, fig. 95.

*† *Margaron* (*Unio*) *pilatus* LEA, Syn., 1870, p. 47.

*† *Unio evitatus* LEA, Pr. Ac. N. Sci. Phila., X, 1868, p. 133; *Jl. Ac. N. Sci. Phila., VI, 1868, p. 279, pl. XXXVIII, fig. 92; * Obs., XII, 1869, p. 39, pl. XXXVIII, fig. 92.

[1] This group seems to stand in part between section *Lanceolaria* and *Nodularia*.

* *Margaron* (*Unio*) *evitatus* LEA, Syn., 1870, p. 47.

* *Unio trirostris* SOWERBY, Conch. Icon., XVI, 1868, pl. LXV, fig. 331.

? *Unio andersonianus* NEVILL, Jl. As. Soc. Beng., XLVI, 1877, p. 40; Researches Yun. Exp. 1877, p. 900, pl. LXXX, figs. 8, 12.[1]

India; southeast Asia.

†NODULARIA TERETIUSCULA Philippi.

* *Margarita* (*Unio*) *cailliandi* LEA, Syn., 1838, p. 24.

* *Margaron* (*Unio*) *cailliandi* LEA, Syn., 1852, p. 36; 1870, p. 58.[2]

* *Unio teretiusculus* PHILIPPI, Conch., III, 1847, p. 45, pl. III, fig. 3.[3]—* ? KUSTER, Conch. Cab., 1856, p. 133, pl. XXXV, fig. 5.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXV, fig. 389.—* JICKELI, Faun. N. O. Af., 1874, p. 276, pl. XI, figs. 1-3.—* PÆTEL, Conch. Sam., III, 1890, p. 169.—* VON MARTENS, Besch. Deuts. Ost-Af., 1897, p. 220.

Unio lithophagus ZIEGLER, manuscript, probably.

Upper Nile drainage.

NODULARIA LEDOULXIANA Charmes.

* *Unio ledoulxianus* CHARMES, Bull. Soc. Mal. Fr., II, 1885, p. 173.—* BOURGUIGNAT, Moll. Af. Eq., 1889, p. 194.—* VON MARTENS, Besch., 1897, p. 229.[4]

Central Africa.

NODULARIA GAUDICHAUDI Eydoux.

* *Unio gaudichaudi* EYDOUX, Guer. Mag., 1838, p. 10, pl. CXVIII, fig. 3.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* PÆTEL, Conch. Sam., III, 1890, p. 153.

* *Margaron* (*Unio*) *gaudichaudi* LEA, Syn., 1850, p. 32; 1870, p. 50.

Small streams of Bengal.

NODULARIA KERAUDRENI Eydoux.

* *Unio keraudreni* EYDOUX, Guer. Mag., 1838, p. 8, pl. CXVIII, figs. 1, 1*a*.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* PÆTEL, Conch. Sam., III, 1890, p. 156.

* *Margaron* (*Unio*) *keraudreni* LEA, Syn., 1852, p. 30; 1870, p. 46.

Rivers and swamps of Bengal.

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[1] I have not seen the figure of *andersonianus*, but Nevill states that it is near *cæruleus*. The *Nodularia cærulea* is an abundant and very widely distributed form, and therefore quite variable in size, form, solidity, color, and sculpture, and it is possible that other so-called species should be merged with it. Some of the above might rank as varieties, but I can hardly separate them.

[2] Lea credits this name to Ferussac manuscript. So far as I know neither Ferussac or anyone else has ever described it. Lea makes *U. teretiusculus* a synonym of it in his Synopsis.

[3] Philippi's figure is a little more rounded posteriorly than are any of the shells I have seen from Africa bearing this name. After a critical comparison of numerous specimens, which are undoubtedly of African origin, I can only place this in the *cæruleus* group (with which it agrees in every essential character) and close to *cæruleus* itself. There are other undoubtedly close relations between species of *Naiades* of the Ethiopian and Oriental regions.

[4] Unfigured. Von Martens places it in the group of *U. teretiusculus*.

†NODULARIA SHURTLEFFIANA Lea.

* *Unio shurtleffianus* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 94; * Obs., VI, 1857, p. 22, pl. XXVII, fig. 17; * Jl. Ac. N. Sci. Phila., III, 1858, p. 302, pl. XXVII, fig. 17.—* P.ETEL, Conch. Sam., III, 1890, p. 167.

* *Margaron* (*Unio*) *shurtleffianus* LEA, Syn., 1870, p. 32.

India; Siam.

†NODULARIA OCCATA Lea.

* *Unio occatus*, LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 307; * Jl. Ac. N. Sci. Phila., VI, 1863, p. 398, pl. L, fig. 304; * Obs., X, 1863, p. 34, pl. L, fig. 304.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXIX, fig. 412.—* PÆTEL, Conch. Sam., III, 1890, p. 161.

* *Margaron* (*Unio*) *occatus*, LEA, Syn., 1870, p. 31.

* † *Unio macilentus*, BENSON, Ann. and Mag., X, 1862, p. 187.—* HANLEY and THEOBALD, Conch. Ind., 1876, p. 5, pl. X, figs. 2, 4; p. 62, pl. CLIV, fig. 5.—* P.ETEL, Conch. Sam., III, 1890, p. 158.

* *Unio rugosus*, HANLEY and THEOBALD, Conch. Ind., 1876, p. 62, pl. CLIV, fig. 3.

India.

NODULARIA MOSSAMBICENSIS von Martens.

* *Unio mossambicensis* VON MARTENS (Peter's manuscript), Mal. Bl., VI, 1860, p. 218, pl. III, figs. 3–5.—* P.ETEL, Conch. Sam., III, 1890, p. 160.—* VON MARTENS, Besch. Deuts. Ost-Af., 1897, p. 225, pl. VII, fig. 2.

* *Unio sennariensis* var. VON MARTENS, Mal. Bl., XXI, 1873, p. 43.

* *Unio parreysi* (v. d. Busch.) var. *schweinefurthi* VON MARTENS, Nov. Conch., IV, 1876, p. 140, pl. CXXXII, figs. 3–5. [1]

Sennaar, northeast Africa; Mosambique, Zambezi River.

†NODULARIA INORNATA Lea.

* *Unio inornatus* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 93; * Obs., VI, 1857, p. 13, pl. XXIV, fig. 6; * Jl. Ac. N. Sci. Phila., III, 1858, p. 293, pl. XXIV, fig. 6.—* VON MARTENS, Pr. Zool. Soc. Lond., 1860, p. 15.—* MORELET, Ser. Conch., IV, 1875, p. 352.—P.ETEL, Conch. Sam., III, 1890, p. 155.

* *Margaron* (*Unio*) *inornatus* LEA, Syn., 1870, p. 47.

Siam; Cambodia.

†NODULARIA PACHYSOMA Benson.

* *Unio pachysoma* BENSON, Ann. and Mag., X, 1862, p. 186.—* HANLEY and THEOBALD, Conch. Ind., 1876, p. 6, pl. XII, fig. 1.

* *Margaron* (*Unio*) *pachysoma* LEA, Syn., 1870, p. 63.

* *Unio pachystoma* P.ETEL, Conch. Sam., III, 1890, p. 152.

Assam.

†NODULARIA BONNEAUDI Eydoux.

* *Unio bonneaudi* EYDOUX, Guer. Mag., 1838, p. 10, pl. CXIX, figs. 1, 1*a*.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* SOWERBY, Conch. Icon., XVI, 1868,

[1] This species seems to be close to *N. occata*, but is thinner and of delicate texture. I am not certain of its exact affinities. I am sure that it is not a variety of *N. mossambicensis*.

pl. XCV, fig. 515.—* HANLEY and THEOBALD, Conch. Ind., 1876, p. 5, pl. X, fig. 6.—ANDERSON, Yunnan Exp., 1878, p. 900, pl. LXXX, figs. 8–12.—* PÆTEL, Conch. Sam., III, 1890, p. 146.

* *Margaron* (*Unio*) *bonneaudi* LEA, Syn., 1852, p. 32; 1870, p. 50.

India.

†NODULARIA TUMIDULA Lea.

* *Unio tumidulus* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 93; *Obs., VI, 1857, p. 15, pl. XXV, fig. 9; * Jl. Ac. N. Sci. Phila., III, 1858, p. 295, pl. XXV, fig. 9.—*VON MARTENS, Pr. Zool. Soc. Lond., 1860, p. 15.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXIX, fig. 482.—* MORELET, Ser. Conch., IV, 1875, p. 351.—* PÆTEL, Conch. Sam., III, 1890, p. 170.

* *Margaron* (*Unio*) *tumidulus* LEA, Syn., 1870, p. 39.

Siam, Cambodia.

†NODULARIA ASPERULA Lea.

* *Unio inornatus* REEVE, Conch. Icon., XVI, 1865, pl. XXIX, fig. 147.[1]

* *Unio asperulus* LEA, Pr. Ac. N. Sci. Phila., X, 1866, p. 133; *Jl. Ac. N. Sci. Phila., VI, 1868, p. 280, pl. XXXVIII, fig. 94; * Obs., XII, 1869, p. 40, pl. XXXVIII, fig. 94.

* *Margaron* (*Unio*) *asperulus* LEA, Syn., 1870, p. 31.

* *Margaron* (*Unio*) *versus* LEA, Syn., 1870, p. 46.

Siam; Cambodia.

NODULARIA ANCEPS Deshayes.

* *Unio anceps* DESHAYES, Nouv. Arch. de Mus., X, 1874, p. 127, pl. VI, figs. 8–12.—* PÆTEL, Conch. Sam., III, 1890, p. 144.

Cambodia.

†NODULARIA PUGIO Benson.

* *Unio pugio* BENSON, Ann. and Mag., X, 1862, p. 193.—* SOWERBY, Conch. Icon., XVI, 1868, pl. XCV, fig. 516.—* PÆTEL, Conch. Sam., III, 1890, p. 164.[2]

Burma.

NODULARIA MICHELOTI L. Morlet.

* *Unio micheloti* L. MORLET, Jl. de Conch., 1886, pp. 77, 291, pl. XIII, figs. 6, 6*a*.—* PÆTEL, Conch. Sam., III, 1890, p. 159.

Tonkin.

NODULARIA FLUCTIGER Lea.

* *Unio fluctiger* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 152; *Jl. Ac. N. Sci. Phila., IV, 1860, p. 250, pl. XXXIX, fig. 130; *Obs., VII, 1860, p. 68, pl. XXXIX, fig. 130.—*KUSTER, Conch. Cab. Unio, 1861, p. 237, pl. LXXX, fig. 1.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XLII, fig. 299.

* *Margaron* (*Unio*) *fluctiger* LEA, Syn., 1870, p. 32.

Southeast Asia, no doubt.

[1] I believe that Reeve's *U. inornatus* = Lea's *U. asperulus*. As Lea had used the name *inornatus* previous to Reeve for a *Unio*, he changed the name of the latter to *U. versus*.

[2] A shell labeled *Unio bourieri* Nevill in the collection of Frederick Stearns in Detroit is, I believe, the same as *U. pugio* Benson. I do not know if Nevill ever described *U. bourieri* or whether it is only a manuscript name.

†NODULARIA SCOBINATA Lea.

**Unio scobinata* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 93; *Obs., VI, 1857, p. 19, pl. XXVI, fig. 13; *Jl. Ac. N. Sci. Phila., III, 1858, p. 299, pl. XXVI, fig. 13.—* VON MARTENS, Pr. Zool. Soc. Lond., 1860, p. 15.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXIII, fig. 313.—* MORELET, Ser. Conch., IV, 1875, p. 354, pl. XVII, figs. 2-6.—* P.ETEL, Conch. Sam., III, 1890, p. 167.

**Margaron* (*Unio*) *scobinatus* LEA, Syn., 1870, p. 32.

**Unio mandarinus* MORELET, Jl. de Conch., XII, 1863, p. 159.—* P.ETEL, Conch. Sam., III, 1890, p. 158.

**Unio pellis-lacerti* MORELET, Jl. de Conch, XIII, 1865, p. 22.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXVI, fig. 457.—* MORELET, Ser. Conch., IV, 1875, p. 355, pl. XVII, fig. 5.—* P.ETEL, Conch. Sam., III, 1890, p. 162.

**Unio venustus* MORELET, Jl. de Conch., XIV, 1866, p. 63.—* P.ETEL, Conch. Sam., III, 1890, p. 171.

**Unio oblatus* LEA, Syn., 1870, p. 64.[1]

Siam; Cochin-China; Cambodia.

NODULARIA GRATIOSA Philippi.[2]

* *Unio gratiosus* PHILIPPI, Conch., I, 1845, p. 20, pl. I, fig. 5.—* CATLOW and REEVE, Conch. Nom., 1845, p. 59.—* ? KUSTER, Conch. Cab. Unio, 1861, p. 239, pl. LXXX, fig. 3.

* *Margaron* (*Unio*) *gratiosus* LEA, Syn., 1870, p. 32.

India probably; Philippi's locality, New Holland, is certainly an error.

†NODULARIA CRISPATA Gould.

* *Unio crispata* GOULD, Pr. Bost. Soc. Nat. Hist., I, 1843, p. 141; *Otia Conch., 1862, p. 191.

* *Unio crispatus* CATLOW and REEVE, Conch. Nom., 1845, p. 58.—* HANLEY and THEOBALD, Conch. Ind., 1876, p. 21, pl. XLV, fig. 1.—* P.ETEL, Conch. Sam., III, 1890, p. 149.

**Margaron* (*Unio*) *crispatus* LEA, Syn., 1870, p. 32.

British Burma.

†NODULARIA NUCLEUS Lea.

* *Unio nucleus* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 94; *Obs., VI, 1857, p. 26, pl. XXVIII, fig. 21; *Jl. Ac. N. Sci. Phila., III, 1858, p. 303, pl. XXVIII, fig. 21.

* *Margaron* (*Unio*) *nucleus* LEA, Syn., 1870, p. 30.

Siam.

†NODULARIA PHASELUS Lea.

* *Unio phaselus* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 94; *Obs., VI, 1857, p. 17, pl. XXVI, fig. 11; *Jl. Ac. N. Sci. Phila., III, 1858, p. 297, pl. XXVI, fig. 11.

* *Margaron* (*Unio*) *phaselus* LEA, Syn., 1870, p. 32.

Siam.

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[1] New name for *Unio venustus* Morelet, preoccupied by Lea.

[2] Philippi's figure is not very distinct, and I can not be sure of what it is, only that it seems to be a member of this group that I can hardly connect with anything else. He credits it to Parreyss.

NODULARIA SCOBINA Hanley.

* *Unio scobina* HANLEY, Biv. Shells, 1856, p. 382, pl. XXIII, fig. 40.[1]—* HANLEY and THEOBALD, Conch. Ind., 1876, p. 22, pl. XLVI, figs. 2, 3.—* P.ETEL, Conch. Sam., III, 1890, p. 167.

Assam.

(Group of *Nodularia pazii.*)

Shell thin, with the hinder point long drawn out; posterior ridge double, low, and sharp, the dorsal line above it straight or incurved; beak sculpture not seen; surface of the shell smooth, dull olive colored; teeth exceedingly compressed; pseudocardinals long, lamellar.

†NODULARIA PAZII.

* *Unio pazii* LEA, Pr. Ac. N. Sci. Phila., VI, 1862, p. 176; *Jl. Ac. N. Sci. Phila., VI, 1866, p. 61, pl. XXI, fig. 60; * Obs., XI, 1867, p. 65, pl. XXI, fig. 60.—* SOWERBY, Conch. Icon., XVI, 1868, pl. XCII, fig. 502.

* *Margaron* (*Unio*) *pazii* LEA, Syn., 1870, p. 39.

China; Siam; Cambodia.

NODULARIA JOURDYI L. Morlet.

* *Unio jourdyi* MORLET, Jl. de Conch., 1886, p. 289, pl. XIII, figs. 5, 5*a*.

Tonkin.

†NODULARIA INGALLSIANA Lea.

* *Unio ingallsianus* LEA, Tr. Am. Phil Soc., X, 1852, p. 282, pl. XXIV, fig. 41; * Obs., V, 1852, p. 38, pl. XXIV, fig. 41.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—* REEVE, Conch. Icon., XVI, 1865, pl. XXVI, fig. 126.—* MORELET, Ser. Conch., IV, 1875, p. 351.—* P.ETEL, Conch. Sam., III, 1890, p. 155.

* *Margaron* (*Unio*) *ingallsianus* LEA, Syn., 1852, p. 36; 1870, p. 58.

Cochin-China; Siam; Cambodia.

(Group of *Nodularia trompi.*)

Shell small, subtrapezoidal, wider behind, slightly inflated, with a rounded posterior ridge; beaks full, sculpture not seen; surface covered with very fine, nodulous, somewhat zigzag corrugations, with upcurved posterior ridges on the posterior slope; epidermis reddish brown or black; hinge teeth compressed; pseudocardinals vertically striate.

†NODULARIA TROMPI Drouet and Chaper.

* *Unio trompi* DROUET and CHAPER, Mem. Soc. Zool. Fr., V, 1892, p. 153, pl. VI, figs. 8–10; Jl. de Conch., XLI, 1893, p. 45.

Borneo.

(Group of *Nodularia olivaria.*)

Shell thin, inflated, blue green or olive green, smooth, shining, with two or more faint ridges on the posterior slope; beaks and disk almost or quite destitute of sculpture; teeth greatly compressed, lamellar.

[1] Credited to Benson manuscript.

†NODULARIA OLIVARIA Lea.

* *Unio olivarius* LEA, Tr. Am. Phil. Soc., IV, 1831, p. 108, pl. XVI, fig. 38; * Obs., I, 1834, p. 118, pl. XVI, fig. 38.—* HANLEY, Test. Moll., 1842, p. 195; * Biv. Shells, 1843, p. 195, pl. XXII, fig. 32.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* CHENU, Ill. Conch., 1858, pl. VIII, figs. 11, 11*a*, 11*b*.—* KUSTER, Conch. Cab. Unio, 1861, p. 244, pl. LXXXII, fig. 2.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXVI, fig. 195.—* HANLEY and THEOBALD, Conch. Ind., 1876, p. 5, pl. X, fig. 1.—PÆTEL, Conch. Sam., III, 1890, p. 161.

* *Margarita* (*Unio*) *olivarius* LEA, Syn., 1836, p. 26; 1838, p. 20; 1852, p. 30; 1870, p. 47.

* *Unio pumilio* KUSTER, Conch. Cab. Unio, 1862, p. 268, pl. XC, fig. 7.

India.

†NODULARIA NUTTALLIANA Lea.

* *Unio nuttallianus* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 103; * Obs., VI, 1857 p. 30, pl. XXX, fig. 25; Jl. Ac. N. Sci. Phila., III, 1858, p. 310, pl. XXX, fig. 25.—* HANLEY and THEOBALD, Conch. Ind., 1876, p. 19, pl. XLI, figs. 5, 6.—* PÆTEL, Conch. Sam., III, 1890, p. 161.

* *Margaron* (*Unio*) *nuttallianus* LEA, Syn., 1870, p. 74.

India.

NODULARIA INVOLUTA Benson.

* *Unio involutus* BENSON, Hanley Biv. Shells, 1856, p. 385, pl. XXIII, fig. 19.—* HANLEY and THEOBALD, Conch. Ind., 1876, p. 19, pl. XLI, fig. 2.—* PÆTEL, Conch. Sam., III, 1890, p. 156.

* *Margaron* (*Unio*) *involutus* LEA, Syn., 1870, p. 37.

* *Unio involuta* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXIV, fig. 177.

Assam.

Group of *Nodularia contradens*.)

Shell inflated, obovate, rhomboid, with a slight swelling at the post base, and a well-developed posterior ridge; beaks full and high, the sculpture consisting of wavy, zigzag ridges which often extend over the shell as somewhat nodulous corrugations; pseudocardinals obliquely or vertically striate; laterals curved, cavity of the beaks rather shallow.

†NODULARIA CONTRADENS Lea.

* *Unio contradens* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 75, pl. XVIII, fig. 58; * Obs., II, 1838, p. 75, pl. XVIII, fig. 58.—* TROSCHEL, Arch. für Nat., V, 1839, Pt. 2, p. 237.—* HANLEY, Test. Moll., 1842, p. 209; Biv. Shells, 1843, p. 209, pl. XXII, fig. 8.—* CATLOW and REEVE, Conch. Nom., 1845, p. 57.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—* CHENU, Ill. Conch., 1858, pl. XXIX, figs. 4, 4*a*, 4*b*.—* REEVE, Conch. Icon., XVI, 1865, pl. XXIX, fig. 149.—* PÆTEL, Conch. Sam., III, 1890, p. 148.

* *Margarita* (*Unio*) *contradens* LEA, Syn., 1838, p. 25.

* *Margaron* (*Unio*) *contradens* LEA, Syn., 1852, p. 39; 1870, p. 46.

* † *Unio jaranus* LEA, Pr. Am. Phil. Soc., I, 1840, p. 285; * Tr. Am. Phil. Soc., VIII, 1842, p. 220, pl. XVIII, fig. 37; * Obs., III, 1842, p. 58, pl. XVIII, fig. 36.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* CHENU, Ill. Conch., 1858, pl. XXVIII, figs. 4, 4*a*, 4*b*.—* KUSTER, Conch. Cab. Unio, 1856, p. 138, pl. XLI, fig. 3; 1861, p. 236, pl. LXXIX, figs. 4, 6.—* SOWERBY, Conch. Icon., XVI, 1868, pl. XC, fig. 489.—* PÆTEL, Conch. Sam., III, 1890, p. 155.

Margaron (Unio) jarannus LEA, Syn., 1852, p. 30.

Unio exilis DUNKER, Zeits. für Mal., III., 1846, p. 109.—MOUSSON, L. und S. W. Moll. Java, 1849, p. 92, pl. XVI, fig. 3.

Margaron (Unio) exilis LEA, Syn., 1852, p. 29.

Unio mutatus MOUSSON, L. und S. W. Moll. Java, 1849, p. 92, pl. XVI, figs. 1, 2; Zeits. für Mal., VII, 1851, p. 46; H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—PÆTEL, Conch. Sam., III, 1890, p. 160.

Margaron (Unio) mutatus LEA, Syn., 1852, p. 29.

Unio mederianus KUSTER,[1] Conch. Cab. Unio, 1861, p. 242, pl. LXXX, fig. 7.—PÆTEL, Conch. Sam., III, 1890, p. 158.

Java.

† NODULARIA DIMOTA Lea.

Unio sumatrensis, LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 153; Jl. Ac. N. Sci. Phila., IV, 1860, p. 239, pl. XXXIV, fig. 118; Obs., VII, 1860, p. 57. pl. XXXIV, fig. 118.—PÆTEL, Conch. Sam., III, 1890, p. 169.

Margaron (Unio) dimotus, LEA, Syn., 1870, p. 30.—[2] PÆTEL, Conch. Sam., III, 1890, p. 150.[3]

Sumatra.

NODULARIA FISCHERIANIA L. Morlet.

Unio fischerianus, L. MORLET, Jl. de Conch., XXXI, 1883, p. 109, pl. IV, fig. 6.—PÆTEL, Conch. Sam., III, 1890, p. 152.

Cambodia.

† NODULARIA ANODONTÆFORMIS Tapperone-Canefri.

Unio (Microdontia) anodontæformis TAPPERONE-CANEFRI, Ann. Mus. Genov., XIX, 1883, p. 295, pl. XI, figs. 3–5.

Unio anodontæformis PÆTEL, Conch. Sam., III, 1890, p. 144.

New Guinea.

† NODULARIA SACELLUS Drouet and Chaper.

Unio sacellus DROUET and CHAPER, Mem. Soc. Zool. Fr., V, 1892, p. 148, pl. V, figs. 4–6; Jl. de Conch., XLI, 1893, p. 43.

Borneo.

† NODULARIA LUGENS Drouet and Chaper.[4]

Unio lugens DROUET and CHAPER, Mem. Soc. Zool. Fr., V, 1892, p. 147, pl. V, figs. 1–3.—DROUET, Jl. de Conch., XLI, 1893, p. 44.

Borneo.

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[1] Kuster credits this to Mousson, Conch. of Java, p. 92. I know of no such work, and the name is not found in Mousson's L. und Suss. W. Moll. von Java.

[2] Changed to this name by Lea because *sumatrensis* was preoccupied for a *Unio* by Dunker.

[3] This species varies much in sculpture, and shows the connection between the nearly smooth *contradens* and the strongly corrugated forms like *rusticus* and *dautzenbergi*. It is really very close to *contradens*.

[4] I am doubtful whether these two are more than varieties of the same thing. The *N. lugens* is darker colored and seems to lack a little tubercle on the hinge, which is sometimes present in *sacellus*.

†NODULARIA FULVASTER Drouet and Chaper.

**Unio fulraster* DROUET and CHAPER, Mem. Soc. Zool. de Fr., V, 1892, p. 154, pl. VI, figs. 11-13.—*DROUET, Jl. de Conch., XLI, 1893, p. 45.

Borneo.

NODULARIA SEMIDECORATA L. Morlet.

**Unio semidecoratus* L. MORLET, Jl. de Conch., XXXVII, 1889, p. 192, pl. VIII, fig. 4.

River Srakeo, Siam.

†NODULARIA RUSTICA Lea.

**Unio rusticus* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 93; *Obs., VI, 1857, p. 14, pl. XXV, fig. 7.—*Jl. Ac. N. Sci. Phila., III, 1858, p. 294, pl. XXV, fig. 7.—*VON MARTENS, Pr. Zool. Soc. Lond., 1860, p. 14.—*MORELET, Ser. Conch., IV, 1875, p. 353, pl. XVII, fig. 7.—*PÆTEL, Conch. Sam., III, 1890, p. 166.

**Margaron* (*Unio*) *rusticus* LEA, Syn., 1870, p. 31.

**Unio paivanus* MORELET, Jl. de Conch., XIII, 1865, p .227.

**Unio cambojensis* SOWERBY, Conch. Icon., XVI, 1866, pl. XLII, fig. 231.—*PÆTEL, Conch. Sam., III, 1890, p. 147.

Siam; Cambodia.

†NODULARIA DAUTZENBERGI L. Morlet.

**Unio dautzenbergi* MORLET, Jl. de Conch., XXXVII, 1889, p. 190, pl. VIII, fig. 5.

River Srakeo, Siam.

NODULARIA SOBOLUS Fischer.

**Unio siamensis* MORLET, Jl. de Conch., XXXVII, 1889, p. 194, pl. VII, fig. 2.

**Unio sobolus* FISCHER, Bull. Soc. d' Autun., 1891, p. 227.[1]

Siam.

NODULARIA VERBECKI Böttger.

**Unio verbecki* BÖTTGER, Zool. Erg. Nied. Ost. Ind., IV, 1897, p. 89, pl. V, figs. 1, 2, 4, 5.—*PÆTEL, Conch. Sam., III, 1890, p. 171.

Sumatra.

†NODULARIA ORIENTALIS Lea.[2]

**Unio orientalis* LEA, Pr. Am. Phil. Soc., I, 1840, p. 285; *Tr. Am. Phil. Soc., VIII, 1842, p. 221, pl. XVIII, fig. 38; *Obs., III, 1842, p. 59, pl. XVIII, fig. 38.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—*CHENU, Ill. Conch, 1858, pl. XXXII, figs. 6, 6*a*, 6*b*.—*KUSTER, Conch. Cab. Unio, 1861, p. 241, pl. LXXX, fig. 16.—*VON MARTENS, Mal. Bl., XIV, 1866, p. 15.—*SOWERBY, Conch. Icon., XVI, pl. XCI, fig. 491.—*PÆTEL, Conch. Sam., III, 1890, p. 162.

[1] Changed from *siamensis* to *sobolus* because the former was preoccupied by Lea. Probably an old, smooth *rusticus*.

[2] I hardly know where to place this, as the only shell I have seen (the type) is evidently young, and has the beaks eroded until I can not make out the sculpture. It seems most likely to be an elongated, somewhat compressed member of the *contradens* group.

* *Margaron* (*Unio*) *orientalis* LEA, Syn., 1852, p. 38; 1870, p. 61.
* *Unio productus* MOUSSON, L. und S. W. Moll. Java, 1849, p. 93, pl. XVII, figs. 3-5; Zeits. für Mal., VII, 1851, p. 46.
* *Unio productior* LEA, Syn., 1852, p. 29.—* VON MARTENS, Mal. Bl., XIV, 1866, p. 16.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.

Java.

Section RADIATULA, Simpson.

(Type, *Unio crispisulcatus* Benson.)

Shell rather solid, triangular oval, with high beaks which are but little inflated, not very full at post base, bluntly pointed behind, the beaks and entire surface covered with radiating, occasionally slightly zigzag or divaricate ridges which are cut more or less into nodules or cancellations by concentric sulcations, the sculpture of the posterior slope stronger, and curving upward; pseudocardinals of the left valve 2 to 3, ragged, the anterior larger, two in the right valve, with a parallel sided socket, the larger teeth compressed but rather solid.[1]

†NODULARIA CRISPISULCATA Benson.

* *Unio crispisulcatus* LEA, Ann. and Mag., X, 1862, p. 193.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XLIX, fig. 262.—* HANLEY and THEOBALD, Conch. Ind., 1876, p. 6., pl. XI, fig. 5.—* PÆTEL, Conch. Sam., III, 1890, p. 149.
* *Margaron* (*Unio*) *crispisulcatus* LEA, Syn., 1870, p. 31.

Burma.

NODULARIA LIMA Simpson.

* *Unio radula* BENSON,[2] in Hanley, Biv. Shells, Supp., 1856, p. 382.—* HANLEY and THEOBALD, Conch. Ind., 1876, p. 5, pl. X, fig. 3.—* PÆTEL, Conch. Sam., III, 1890, p. 165.
* *Dysnomia radula* ROCHEBRUNE, Bull. Soc. Phil., VI, 1882, p. 42.

Assam; Cambodia.

Section CÆLATURA Conrad. 1853.

(Type, *Unio ægyptiacus* Caillaud.)

Shell elliptical, pointed or rounded behind, usually slightly produced at the post base; beak sculpture consisting of zigzag ridges which are generally quite pustulous, the sculpture often extending on to the usually rayed disk; teeth compressed; pseudocardinals lamellar.

Animal described under *Nodularia*. (See page 806.)

(Group of *Nodularia ægyptiaca*.)

Characters the same as of the section.

[1] Notwithstanding the considerable difference between this group and all other Nodularias there are species such as *occatus*, which seem to stand between it and the *cæruleus* group, and show the relationship of the two.

[2] The name *radula* was used by Say for a *Unio* in 1829. I change Benson's name as above. I am not positive as to the relationship of this species.

† NODULARIA ÆGYPTIACA Cailliaud.

* *Unio* species nuovo SAVIGNY, Icon. Moli. Egypt, 1813, pl. VII, figs. 3–6.

Unio ægyptiaca CAILLIAUD, Voy. à Méroé, II, 1826, pl. LXI, figs. 6, 7.[1]—* DESHAYES, An. sans Vert., 2d ed., 1835, p. 553; * Enc. Méth., II, 1830, p. 587.—* CATLOW and REEVE, Conch. Nom., 1845, p. 58.

* *Margarita* (*Unio*) *egyptiacus* LEA, Syn., 1838, p. 21.

* *Margaron* (*Unio*) *egyptiacus* LEA, Syn., 1852, p. 32; 1870, p. 50.

* *Unio egyptiacus* HANLEY, Test. Moll., 1842, p. 198; * Biv. Shells, 1843, p. 198, pl. XX, fig. 56.—* KUSTER, Conch. Cab., 1856, p. 157, pl. XLV, fig. 2.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* REEVE, Conch. Icon., XVI, 1865, pl. XXVI, fig. 132.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 179.—* VON MARTENS, Mal. Bl., XIII, 1866, p. 11.—* MORELET, Moll. Terr. et Fluv. 1868, p. 97.—* JICKELI (part) Faun. Moll. N. O. Af., 1874, p. 271, pl. X, figs. 1–8.—* KOBELT, Icon., new ed., 1886, p. 25, pl. XLIV, figs. 262–265.

* *Unio eucyphus* BOURGUIGNAT, Rev. et. Mag., IX, 1857, p. 19, pl. III, figs. 1–3.—* PÆTEL, Conch. Sam., III, 1890, p. 152.

* *Unio bourguignati* LANDRAN, Seance Soc. Sci. Nat. Seine, 1864, p. 5, pl. —, figs. 1–3.

* *Pharaonia bourguignati* ROCHEBRUNE, Bull. Soc. Mal. Fr., III, 1886, p. 113.

Nile system; High Cazamance, West Africa (Vignon); both sides of the equator in Central Africa (Dohrn).

† NODULARIA NILOTICA Cailliaud.

Unio nilotica CAILLIAUD, Voy. à Méroé, II, 1826, pl. LXI, figs. 8, 9.—* DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 522; * Enc. Méth., II, 1830, p. 585.—* CATLOW and REEVE, Conch. Nom., 1845, p. 61.—* HANLEY, Test. Moll., 1842, p. 197; * Biv. Shells, 1843, p. 197, pl. XXI, fig. 39.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* VON MARTENS, Mal. Bl., XIII, 1866, p. 13.—* PÆTEL, Conch. Sam., III, 1890, p. 161.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 180.

* *Margarita* (*Unio*) *niloticus* LEA, Syn., 1836, p. 29; 1838, p. 21.

* *Margaron* (*Unio*) *niloticus* LEA, Syn., 1852, p. 31; 1870, p. 50.

Unio pumilus ZEIGLER, manuscript, and of authors.

* *Unio parreyssi* PHILIPPI, Conch., III, 1848, p. 81, pl. V, fig. 6.—* JICKELI, Faun. Moll. N. O. Af., 1874, p. 373.

* *Unio rugifer* KUSTER, Conch. Cab. Unio, 1856, p. 157, pl. XLV, figs. 3, 4.—* VON MARTENS, Mal. Bl., XIII, 1866, p. 12.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 180.

* *Unio sennaariensis* KUSTER, Conch. Cab. Unio, 1862, p. 280, pl. XCIV, figs. 5, 6.—* PÆTEL, Conch. Sam., III, 1890, p. 167.

* *Unio æneus* JICKELI, Faun. Moll. N. O. Af., 1874, p. 274, pl. IX, fig. 2.—* PÆTEL, Conch. Sam., III, 1890, p. 144.

* *Unio charbonnieri* BOURGUIGNAT, Un. and Ir. Tan., 1886, p. 9.—* Icon. Mal. Tan., 1888, pl. XX, figs. 1, 2.—* PÆTEL, Conch. Sam., III, 1890, p. 147.

* *Unio coulboisi* BOURGUIGNAT, Un. and Ir. Tan., 1886, p. 12; * Icon. Mal. Tan., 1888, pl. XX, figs. 3, 4.—* PÆTEL, Conch. Sam., III, 1890, p. 149.

* *Unio dromanzi* BOURGUIGNAT, Un. and Ir. Tan., 1886, p. 17; * Icon. Mal. Tan, 1888, pl. XXII, figs. 1. 2.—* PÆTEL, Conch. Sam., III, 1890, p. 151.

[1] This species is often credited to Ferussac, but I do not know that he ever described it. It is considered by many to be the same as *Nodularia nilotica*, but the comparison of large series of material and authentic specimens in the Lea collection from Cailliaud incline me to separate them. There is, however, great variation in their characters, but *ægyptiaca* is a thinner, more rounded shell than *niloticus*, and has lamellar pseudo-cardinals.

NODULARIA NILOTICA var. GERRARDI von Martens.

**Unio gerrardi* VON MARTENS, Besch. Ost-Af., 1897, p. 223, pl. VII, fig. 5.

Nile system; Lake Tanganyika; Senegal and High Cazamance (Vignon).

NODULARIA BAGDADENSIS Bourguignat.[1]

**Unio bagdadensis* BOURGUIGNAT, Test. Nov. Saulc., 1852, p. 30; *Cat. Rais., 1853, p. 78, pl. IV, figs. 4–6.
**Margaron (Unio) bagdadensis* LEA, Syn., 1870, p. 46.

Bagdad, on the Tigris River.

NODULARIA RANDABELI Bourguignat.[2]

**Unio randabeli* BOURGUIGNAT, Un. and Ir. Tan., 1886, p. 22; *Icon. Mal. Tan., 1888, pl. XXI, figs. 3, 4.—*PÆTEL, Conch. Sam., III, 1890, p. 165.

Lake Tanganyika.

†NODULARIA ESSOENSIS Chaper.

**Unio essoensis* CHAPER, Bull. Soc. Zool. Fr., X. 1885, p. 481, pl. XI, figs. 8, 9.—*PÆTEL, Conch. Sam., III, 1890, p. 152.

Assini, west coast of Africa.

NODULARIA DECAMPSIANA Wattebled.[3]

**Unio decampsianus* WATTEBLED, Jl. de Conch., XXXII, 1884, p. 132, pl. VII, fig. 1.—*PÆTEL, Conch. Sam., III, 1890, p. 150.
**Unio campsianus* PÆTEL, Conch. Sam., III, 1890, p. 147.

Western Soudan.

NODULARIA BELLAMYI Jousseaume.

**Pharaonia bellamyi* JOUSSEAUME, Bull. Soc. Zool. Fr., XI, 1886, p. 486, pl. XII, figs. 7*a*, 7*b*.

Faraba, on the Niger; High Senegal.

NODULARIA RENEA Jousseaume.

**Reneus reneus* JOUSSEAUME, Bull. Soc. Zool. Fr., XI, 1886, p. 482, pl. XII, figs. 4*a*, 4*b*.
**Reneus faidherbi* JOUSSEAUME, Bull. Soc. Zool. Fr., XI, 1886, p. 483, pl. XII, figs. 5, 5*a*.

Niger at Kayon; Senegal River; High Senegal.

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[1] This appears from the figures and description to be a member of the *Ægyptiaca* group of *Nodularia*. It is possible that it came from Asia Minor, but more likely that it is an African species. The *Unio cucyphus* of Bourguignat, which he credits to this region, is believed by Lea to be the *U. ægyptiacus* of Cailliaud, and I agree with him. *Unio bagdadensis* may be merely a peculiar form of the same thing.

[2] This may possibly be distinct from *N. nilotica*, or it may only be an oddly-formed specimen.

[3] I can not be positive as to the systematic position of this species, but it probably belongs here.

*NODULARIA FOULADOUGOUENSIS Jousseaume.

**Reneus fouladougouensis* JOUSSEAUME, Bull. Soc. Zool. Fr., XI, 1886, p. 485, pl. XII, figs. 6, 6*a*.

Fouladougou, Niger; High Senegal.

† NODULARIA GABONENSIS Kuster.

* *Unio gabonensis* KUSTER, Conch. Cab. Unio, 1862, p. 291, pl. XCVII, fig. 7.—* PÆTEL, Conch. Sam., III, 1890, p. 153.

Margaron (*Unio*) *gabonensis* LEA, Syn., 1870, p. 47.

Gaboon River, West Africa.

† NODULARIA ÆQUITORIA Morelet.

* *Unio æquitorius* MORELET, Jl. de Conch., XV, 1885, p. 31, pl. II, fig. 9.[1]—* PÆTEL, Conch. Sam., III, 1890, p. 144.

* *Unio landanensis* SCHEPMAN, Notes Leyden Mus., VIII, 1891, p. 113, pl. VIII, figs. 3*a*, 3*b*.

Congo drainage.

NODULARIA HOREI E. A. Smith.

* *Unio horei* E. A. SMITH, Ann. and Mag., VI, 1880, p. 429; * Pr. Zool. Soc. Lond., 1881, p. 299, pl. XXXIV, fig. 37.—* CROSSE, Jl. de Conch., XXXIX, 1881, p. 133.—* VON MARTENS, Besch. Deuts. Ost-Af., 1897, p. 235.

* *Grandidieria horei* BOURGNIGNAT, Bull. Soc. Mal. Fr., II, 1885, p. 6.

Lake Tanganyika.

NODULARIA BORELLII Ancey.

* *Unio borellii* ANCEY, Bull. Soc. Zool. Fr., VII, 1894, p. 226, fig. 2.—* VON MARTENS, Besch. Deuts. Ost-Af., 1897, p. 227.

Lake Nyassa and vicinity.

NODULARIA EMINI von Martens.

* *Unio emini* VON MARTENS, Besch. Deuts. Ost-Af., 1897, p. 224, pl. VII, fig. 14.

Victoria Nyanza.

NODULARIA BOHMI von Martens.

* *Unio bohmi* VON MARTENS, Besch. Deuts. Ost-Af., 1897, p. 223, pl. VII, fig. 9.

Lake Tanganyika.

NODULARIA AMBIFARIA von Martens.

* *Unio ambifarius* VON MARTENS, Besch. Deuts. Ost-Af., 1897, p. 225, pl. VII, fig. 20.

Dar-es-Ssalam, East Africa.

NODULARIA LECHAPTOISI Ancey.

* *Unio lechaptoisi* ANCEY, Bull. Soc. Zool. Fr., VII, 1894, p. 228, fig. 3.—* VON MARTENS, Besch. Deuts. Ost-Af., 1897, p. 226.

Shire River, Lake Nyassa.

[1] Doubtfully distinct from *gabonensis*.

NODULARIA LIEDERI von Martens.

* *Unio liederi* VON MARTENS, Besch. Deuts. Ost-Af., 1897, p. 226, pl. VII, fig. 19.

Lake Nyassa.

NODULARIA CALATHUS Bourgnignat.[1]

* *Unio calathus* BOURGNIGNAT, Esp. Ouk. et Tan., 1885, p. 23.

Tanganyika.

NODULARIA BAKOYI Rochebrune.

* *Unio bakoyi* ROCHEBRUNE, Bull. Soc. Phil., 7th ser., VI, 1882, p. 33.

Bakoy, High Senegal.

NODULARIA RADIOTA Charmes.

* *Unio radiotus* CHARMES, Bull. Soc. Mal. Fr., II, 1885, p. 166.

Central Africa.

NODULARIA JULIANI Rang.

* *Unio juliani* RANG, Nouv. Ann. Mus., 1835, p. 309.

Senegal.

(Group of *Nodularia kunenensis.*)

Shell elliptical, subinflated, solid, narrowly biangulate behind, the point of the shell being about midway up the height, the post-base inflated, beaks full, eroded in the specimen figured but no doubt zigzag sculptured; whole surface of the shell covered with wavy corrugations; epidermis brownish; one rather solid, deeply incised pseudocardinal in the right valve, two in the left; nacre yellowish white; muscle scars deep. Animal unknown.

NODULARIA KUNENENSIS Mousson.

* *Unio kunenensis* MOUSSON, Jl. de Conch., XXXV, 1887, p. 300, pl. X.I, fig. 10.—SMITH, Ann. and Mag., VIII, 1891, p. 319.

Head of Kunene River, North Ovampo, Southwest Africa.

Section CAFFERIA Simpson, 1900.

(Type, *Unio caffer* Krauss.)

Shell elongated or elliptical, rhomboid and solid when old; beaks full, the sculpture corrugated zigzag, the ridges often extending over the disk; epidermis yellowish-brown to nearly black, dull colored, somewhat sulcate; teeth rather strong, muscle scars deep, well defined.

(Group of *Nodularia caffer.* Characters as in the section.)

[1] This and the following species are unfigured, and are referred by von Martens and others to this group. I know nothing of them. I am a little in doubt as to the affinities of some of the above-figured species which I have not seen, but they are placed here on the excellent authority of von Martens.

†NODULARIA CAFFER Krauss.

* *Unio caffer* KRAUSS, Sud. Af. Moll., 1848, p. 18, pl. I, fig. 14.—* KUSTER (part), Conch. Cab. Unio, 1856, p. 143, pl. XLII, fig. 2.—* HANLEY, Biv. Shells, 1856, p. 385, pl. XXI, fig. 40.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XLI, fig. 226.—* SMITH, Ann. and Mag., VIII, 1891, p. 317.[1]—* PÆTEL, Conch. Sam., III, 1890, p. 147.

* *Margaron* (*Unio*) *caffer* LEA, Syn., 1852, p. 32; 1870, p. 48.

* ? *Unio schwerzenbachii* BOURGUIGNAT, Rev. et Mag., 1856, p. 71.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XLIV, fig. 241.

* † *Unio verreauxianus* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 94; Obs., VI, 1857, p. 21, pl. XXVI, fig. 16; Jl. Ac. N. Sci. Phila., III, 1858, p. 301, pl. XXVII, fig. 16.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXIX, fig. 352.—* PÆTEL, Conch. Sam., III, 1890, p. 171.

* *Margaron* (*Unio*) *verreauxianus* LEA, Syn., 1870, p. 36.

* *Unio verreauxi* PÆTEL, Conch. Sam., III, 1890, p. 171.

* *Unio navigoliformis* LEA, Pr. Ac. N. Sci. Phila., XI, 1859, p. 152; Jl. Ac. N. Sci. Phila., IV, 1860, p. 248, pl. XXXVII, fig. 124; * Obs., VII, 1860, p. 63, pl. XXXVII, fig. 124.—* REEVE, Conch. Icon., XVI, 1865, pl. XXIV, fig. 114.—* PÆTEL, C. Sam., III, 1890, p. 160.

* *Margaron* (*Unio*) *navigoliformis* LEA, Syn., 1870, p. 31.

*† *Unio natalensis* LEA, Pr. Ac. N. Sci. Phila., VIII, 1864, p. 113; * Jl. Ac. N. Sci. Phila., VI, 1866, p. 59, pl. XX, fig. 57; * Obs., XI, 1867, p. 63, pl. XX, fig. 57.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXI, fig. 362.—* PÆTEL, Conch. Sam., III, 1890, p. 160.

* *Margaron* (*Unio*) *natalensis* LEA, Syn., 1870, p. 32.

* *Unio rectilinearis* SOWERBY, Conch. Icon., XVI, 1868, pl. LXV, fig. 332.[2]

†NODULARIA CAFFER var. AFRICANA Lea.

* *Unio africanus* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 94; * Jl. Ac. N. Sci. Phila., III, 1857, p. 300, pl. XXVII, fig. 115; * Obs., VI, 1857, p. 20, pl. XXVII, fig. 15.—* REEVE, Conch. Icon., XVI, 1865, pl. XXII, fig. 100.

* *Margaron* (*Unio*) *africanus* LEA, Syn., 1870, p. 48.

* *Unio caffer* KUSTER (part), Conch. Cab. Unio, 1856, p. 143, pl. XLII, fig. 3.

* *Unio niloticus* KUSTER, Conch. Cab. Unio, 1856, p. 158, pl. XLV, fig. 5.

†NODULARIA CAFFER var. VAALENSIS Chaper.

* *Unio vaalensis* CHAPER, Bull. Soc. Zool. Fr., X, 1885, p. 480, pl. XI, figs. 1-3.—* PÆTEL, Conch. Sam., III, 1890, p. 171.

South Africa.

NODULARIA TRAVERSII Pollonera.[3]

* *Unio traversii* POLLONERA, Bull. Soc. Mal. It., XIII, 1888, p. 85, pl. III, figs. 14, 15.

Hawash River, Shoa, Africa.

[1] According to Smith the above, *U. verreauxianus* Lea, *africanus* Lea, *natalensis* Lea, and *vaalensis* Chaper, are all one species. I think he is right, but it seems to me that one or two of these forms are worthy of varietal names. I have seen the types of most and authentic specimens of all of them.

[2] Said to come from the Columbia River, but it did not.

[3] Possibly a variety of *N. caffer*.

NODULARIA JICKELI Simpson.

* *?Unio teretiusculus* JICKELI,[1] Faun. Moll. N. O. Af., 1874, p. 276, pl. XI, figs. 3, 3*a*, 3*b*.

Northeast Africa.

NODULARIA ACUMINATA H. Adams.

* *Unio acuminatus* H. ADAMS, Pr. Zool. Soc. Lond., 1866, p. 376.—* PÆTEL, Conch. Sam., III, 1890, p. 143.—* SMITH, Ann. and Mag., X, 1892, p. 127, pl. XII, fig. 12.—* VON MARTENS, Besch. Deuts. Ost-Af., 1897, p. 227, pl. VII, figs. 11, 12.

Lake Albert Nyanza.

NODULARIA DEMBEÆ Reeve.

* *Unio dembeæ* REEVE, Conch. Icon., XVI, 1865, pl. XXIX, fig. 153.—* JICKELI, Faun. Moll. Af., 1874, p. 275, pl. IX, figs. 3-4.—* ROSSMASSLER, Bull. Soc. Mal. It., XIII, 1888, p. 84.—* PÆTEL, Conch. Sam., III, 1890, p. 150.

Abyssinia.

NODULARIA LOURDELLI Bourguignat.

* *Unio lourdelli* BOURGUIGNAT, Bull. Soc. Mal. Fr., IV, 1887, p. 271.—* SMITH, Ann. and Mag., X, 1892, p. 128, pl. XII, figs. 13-15.—* VON MARTENS, Besch. Deuts. Ost-Af., 1897, p. 228.

Victoria Nyanza Lake.

NODULARIA ABYSSINICA von Martens.

* *Unio abyssinicus* VON MARTENS, Mal. Bl., XIII, 1866, p. 102; * XIV, 1867, p. 17.—* JICKELI, Faun. Moll. N. O. Af., 1874, p. 278, pl. IX, fig. 5; X, fig. 10.—* PÆTEL, Conch. Sam., III, 1890, p. 143.

Abyssinia.

NODULARIA DIMINUTA Lea.

* *Unio diminutis* LEA,[2] Pr. Ac. N. Sci. Phila., III, 1859 p. 151; * Jl. Ac. N. Sci. Phila., 1860, p. 254, pl. XXXIX, fig. 134; * Obs., VII, 1860, p. 72, pl. XXXIX, fig. 134.—* REEVE, Conch. Icon., XVI, 1865, pl. XXVIII, fig. 141.—* JICKELI, Faun. Moll. Af., 1874, p. 280.—* PÆTEL, Conch. Sam., III, 1890, p. 150.

* *Margaron* (*Unio*) *diminutus* LEA, Syn., 1870, p. 31.

* *Unio gratiosus* PÆTEL, Conch. Sam., III, 1890, p. 154.

East Africa.

The following unfigured species are said to belong here:

* *Unio mandinguorum* ROCHEBRUNE, Bull. Soc. Phil., 7th ser., VI, 1882, p. 34.

Bakoy, High Senegal.

* *Unio zeyheri* MENKE, Zeits. für Mal., VI, 1848, p. 28.

South Africa.

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[1] Not *teretiusculus* Philippi, but a larger elongate solid rhomboid form, which is certainly distinct. I therefore name it in honor of Jickeli.

[2] So in the first published description, probably a typographical error. I am not certain as to the relationships of the species, but presume that it belongs here.

(Group of *Nodularia fissidens.*)

Shell solid, compressed, subelliptical to subrhomboid, with rather full beaks, which have radiate, corrugated sculpture extending out on the disk as wavy sulcations, and changing near the edge to plain sulcations; posterior ridge low, rounded; hinge strong; right valve with two pseudocardinals, the lower the larger, showing a tendency to split up, and having a gape in the plate behind, and having one lateral; two pseudocardinals in the left, somewhat split, and two laterals; muscle scars deep, distinct.

NODULARIA FISSIDENS Böttger.

* *Unio* (*Hyridella*) *fissidens* BÖTTGER, Ber. Senck. Ges., 1886, p. 27, pl. II, figs. 6*ab*, 7*ab*.

Kalahari Desert. Southwest Africa.

NODULARIA HYGAPANUS Böttger.

* *Unio* (*Hyridella*) *hygapanus* BÖTTGER, Ber. Senck. Ges., 1886, p. 26, pl. II, fig. 6.

Kalahari Desert. I am not certain as to the relationships of these two species.

Genus HARMANDIA Rochebrune, 1882.

(Type, *Harmandia somboriensis* Rochebrune.)

Harmandia ROCHEBRUNE, Bull. Soc. Phil., VI, 1882, p. 45.

Shell subtrapezoidal, subalate, rather thin, posteriorly compressed, with low beaks and irregularly radial sculpture, a few of the ribs converging at the center of the disk, the rest becoming divaricate and covering the shell, those of the posterior slope springing from the rib on the low, posterior ridge; epidermis gray green; left valve with two arcuate, compressed, elongate pseudocardinals in front and a triangular cardinal under the beak, the right with two pseudocardinals in front and a pit under the beak; there are two nearly straight lamellar laterals in each valve, and a small, up-curved lamella above them near their posterior ends; anterior muscle scars deep; nacre white, brilliant, showing the outside sculpture.

Animal unknown.

HARMANDIA SOMBORIENSIS Rochebrune.

* *Harmandia somboriensis* ROCHEBRUNE, Bull. Soc. Phil., VI, 1882, p. 46, pl. I, figs. 1-3..

Rapids of Sombor sombor, Mekong.

Genus GRANDIDIERIA Bourguignat, 1885.

(Type, *Unio burtoni* Woodward.)

Grandidieria BOURGUIGNAT, Bull. Soc. Mal. Fr., II, 1885, p. 6.

Shell small, oval, rounded or rhomboid, solid, much inflated, generally narrowly biangulate behind, often apparently of two forms, one more

inflated in the basal and post-basal parts than the other; beaks high, and pointed, curved forward and inward, very delicately and beautifully sculptured with zigzag liræ, which become finely nodulous and sulcate on the disk, especially in front and behind; posterior ridge well developed, often slightly double; hinge line curved; two pseudocardinals in the right valve separated by a parallel-sided socket, one or two in the left, with often an irregular, triangular, ragged tooth under the beak which is frequently reflexed; one obliquely striate lateral in the right valve and two in the left; nacre of peculiarly soft, rich texture, white, coppery, or purplish, delicately radiate; beak cavities moderate; muscle scars distinct.[1]

†GRANDIDIERIA BURTONI Woodward.

* *Unio burtoni* WOODWARD, Proc. Zool. Soc. Lond., 1859, p. 348, pl. XLVII, fig. 2; *Ann. and Mag., V, 1860, p. 338.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XLVII, fig. 251.—* SMITH, Proc. Zool. Soc. Lond., 1881, p. 297, pl. XXXIV, figs. 33, 33*b*.—* VON MARTENS, Besch. Deuts. Ost-Af., 1897, p. 237.

* *Margaron (Unio) burtoni* LEA, Syn., 1870, p. 31.

* *Grandidieria burtoni* BOURGUIGNAT, Bull. Soc. Mal. Fr., II, 1885, p. 6.

* *Grandidieria cyrenopsis* BOURGUIGNAT, Bull. Soc. Mal. Fr., II, 1885, p. 9, pl. I, figs. 7–9; *Icon. Mal. Tan., 1888, pl. XIX, figs. 1-3.

GRANDIDIERIA BURTONI var. SERVAINIANA Bourguignat.

* *Grandidieria servainiana* BOURGUIGNAT, Bull. Soc. Mal. Fr., II, 1885, p. 6.

* *Unio burtoni* var. *servainiana* VON MARTENS, Besch. Deuts. Ost-Af., 1897, p. 238.

GRANDIDIERIA BURTONI var. INSIGNIS Bourguignat.

* *Grandidieria insignis* BOURGUIGNAT, Esp. Ouk. Tan., 1885, p. 16.

* *Unio burtoni* var. *insignis* VON MARTENS, Besch. Deuts. Ost-Af., 1897, p. 238.

GRANDIDIERIA BURTONI var. STURANYI von Martens.

Grandidieria STURANY, Baumann, Durch Massailand, 1894, p. 6, pl. XXIV, fig. 31; XXV, fig. 35.

Unio burtoni var. *sturanyi* VON MARTENS, Besch. Deuts. Ost-Af., 1897, p. 238.

Lake Tanganyika.

†GRANDIDIERIA TANGANYICENSIS Smith.

* *Unio tanganyicensis* SMITH, Proc. Zool. Soc. Lond., 1880, p. 351, pl. XXXI, p. 9, 9*a*; *Proc. Zool. Soc. Lond., 1881, p. 298, pl. XXXIV, fig. 35.—* PÆTEL, Conch. Sam., III, 1890, p. 169.—* VON MARTENS, Besch. Deuts. Ost-Af., 1897, p. 240.

* *Grandidieria tanganikana* BOURGUIGNAT, Bull. Soc. Mal. Fr., II, 1885, p. 7.

Lake Tanganyika.

[1] Bourguignat, by a most brilliant stroke, placed this group in the *Corbiculidæ*, and stated that he knew twenty-five species, and had no doubt that there would be at least one hundred when a thorough search is made. The group is an exceedingly difficult and variable one, and, judging from the large number of species he has founded on the most trivial variations, we may consider it exceedingly fortunate that he never saw the other seventy-five. I have seen but a limited amount of material, but I am led to believe that two forms of the same species often exist, as in *Lampsilis* and allied genera, and which may be male and female shells. I know nothing of the animal and I am unable to do justice to the genus.

†GRANDIDIERIA SMITHI Bourguignat.

[a] *Unio burtoni* SMITH (part), Proc. Zool. Soc., 1881, pl. XXXIV, fig. 33*a*.
[b] *Grandidieria smithi* BOURGUIGNAT, Bull. Soc. Mal. Fr., II, 1885, p. 7.
[c] *Unio burtoni* var. *smithi* VON MARTENS, Besch. Deuts. Ost-Af., 1897, p. 238.

Lake Tanganyika.

GRANDIDIERIA GRAVIDA Bourguignat.

[a] *Grandidieria gravida* BOURGUIGNAT, Bull. Soc. Mal. Fr., II, 1885, p. 7, pl. I, figs. 1–6; [b] Icon. Moll. Tan., 1888, p. 41, pl. XVIII, figs. 11–16.
[a] *Grandidieria rostrata* BOURGUIGNAT, Bull. Soc. Mal. Fr., II, 1885, p. 10, pl. I, figs. 10–12; [b] Icon. Moll. Tan., 1888, p. 41, pl. XVIII, figs. 17–19.
[c] *Unio rostralis* VON MARTENS, Besch. Deuts. Ost-Af., 1897, p. 238.

Lake Tanganyika.

†GRANDIDIERIA THOMSONI Smith.

[a] *Unio thomsoni* SMITH, Ann. and Mag., VI, 1880, p. 430; [b] Proc. Zool. Soc. Lond., 1881, p. 299, pl. XXXIV, fig. 36.—[c] CROSSE, Jl. de Conch., XXIV, 1881, p. 133.—[c] VON MARTENS, Besch. Deuts. Ost-Af., 1897, p. 240.
[a] *Grandidieria thomsoni* BOURGUIGNAT, Bull. Soc. Mal. Fr., II, 1885, p. 7; [b] Moll. Gir. Tan., 1885, p. 100.
[a] *Grandidieria corbicula* BOURGUIGNAT, Not. Prod., 1885, p. 100; [b] Moll. Gir. Tan., 1885, p. 100; [b] Icon. Moll. Tan., 1888, p. 43, pl. XIX, figs. 10–12.
[a] *Grandidieria granulosa* BOURGUIGNAT, Not. Prod., 1885, p. 102; [b] Icon. Moll. Tan., 1888, p. 43, pl. XIX, figs. 1, 2.
[a] *Grandidieria singularis* BOURGUIGNAT, Icon. Moll. Tan., 1888, p. 43, pl. XIX, figs. 18–20

Lake Tanganyika.

GRANDIDIERIA RHYNCHONELLA Bourgingnat.

[a] *Grandidieria rhynchonella* BOURGUIGNAT, Icon. Moll. Tan., 1888, p. 43, pl. XIX, figs. 16, 17.

Lake Tanganyika.

GRANDIDIERIA CALLISTA Bourgingnat.

[a] *Grandidieria callista* BOURGUIGNAT, Icon. Moll. Tan., 1888, p. 43, pl. XIX, figs. 13–15.[1]

Lake Tanganyika.

GRANDIDIERIA BOURGUIGNATI Joubert.

[a] *Grandidieria bourguignati* JOUBERT in Bourguignat, Icon. Moll. Tan., 1888, p. 43, pl. XIX, figs. 7–9.

Lake Tanganyika.

GRANDIDIERIA ANCEYI Bourguignat.

[a] *Unio burtoni* SMITH, (part) Proc. Zool. Soc. Lond., 1881, p. 297, pl. XXXIV, fig. 33*a*.
[a] *Grandidieria anceyi* BOURGUIGNAT, Esp. Ouk. et Tan., 1885, p. 15; Moll. Tan., 1888, p. 43, pl. XIX, figs. 4–6.[2]

Lake Tanganyika.

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[1] Probably a strangely distorted form of some other species.
[2] I am satisfied that Smith's figure 33*a* is not *burtoni*, but a valid species—*G. anceyi* Bourguignat.

The following are unfigured species of Grandidieria:

G. rotundata Bourguignat, Not. Prod., 1885, p. 98.
G. mira Bourguignat, Not. Prod., 1885, p. 96.
G. locardiana Bourguignat, Esp. Ouk., 1885, p. 18.
G. incarnata Bourguignat, Moll. Gir., 1885, p. 101.
G. giraudi Bourguignat, Not. Prod., 1885, p. 95.
G. elongata Bourguignat, Moll. Gir., 1885, p. 14.

Genus PHYSUNIO, Simpson, 1900.

(Type, *Unio graridus* Lea.)

Shell thin, irregularly obovate, narrowed in front, decidedly produced at post base, pointed behind and posteriorly winged, with a moderate posterior ridge and often a second or third faint ridge above it; beak sculpture zigzag radial, somewhat disposed in two sets, the one down the posterior ridge slightly nodulous; posterior slope having irregular radial corrugations, the rest of the shell smooth; epidermis often cloth-like, with one or more green rays on the posterior slope; hinge line curved; a single obliquely granularly striate pseudocardinal and generally three laterals in the left valve, and two pseudocardinals and two laterals in the right, all greatly compressed; beak cavities deep; muscle scars irregular; nacre bright, bluish, and iridescent.

Animal unknown.

Section PHYSUNIO Simpson, 1900.

(Type, *Unio graridus* Lea.)

Shell inflated; beak cavities deep and rounded.

†PHYSUNIO GRAVIDUS Lea.

* *Unio graridus* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 93; Obs., VI, 1857, p. 12, pl. XXIV, fig. 5; Jl. Ac. N. Sci. Phila., III, 1858, p. 292, pl. XXIV, fig. 5.—* VON MARTENS, Pr. Zool. Soc. Lond., 1860, p. 14.—* SOWERBY, Conch. Icon., XVI, 1866, pl. LII, fig. 271.—* MORELET, Ser. Conch., IV, 1875, p. 347.—* PÆTEL, Conch. Sam., III, 1890, p. 154.

* *Margaron* (*Unio*) *gravidus* LEA, Syn., 1870, p. 28.

* *Lampsilis graridus* ROCHEBRUNE, Bull. Soc. Phil., VI, 1882, p. 43.

* *Unio abnormis* MORELET, Rev. et Mag., XIV, 1862, p. 480.

* *Unio superbus* SOWERBY, Conch. Icon., XVI, 1867, p. LIX, fig. 295.

Siam; Cambodia; Cochin China.

†PHYSUNIO SUPERBUS Lea.

* *Unio superbus* LEA, Desc. 12 New Uniones, 1843 (no pagination); Tr. Am. Phil. Soc., IX, 1845, p. 281, pl. XLII, fig. 11; Obs., IV, 1848, p. 39, pl. XLII, fig. 11.—H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 498.—* VON MARTENS, Mal. Bl., XIV, 1866, p. 14.—* PÆTEL, Conch. Sam., III, 1890, p. 169.

* *Margaron* (*Unio*) *superbus* LEA, Syn., 1852, p. 19; 1870, p. 28.

* *Unio velaris* HANLEY, Biv. Shells, 1856, p. 385, pl. XXIII, fig. 42.[1]

* *Unio massini* MORELET, Jl. de Conch., XII, 1864, p. 288; Ser. Conch., IV, 1875, p. 348, pl. XV, figs. 1, 3.—* PÆTEL, Conch. Sam., III, 1890, p. 158.

Sumatra; Cochin China.

[1] Credited to Benson manuscript.

PHYSUNIO CROSSEI Deshayes and Julien.

* *Unio crossei* DESHAYES and JULIEN, N. Arch. Mus., X, 1874, p. 124, pl. VI, figs. 5-7.—* PÆTEL, Conch. Sam., III, 1890, p. 149.

Cambodia; Cochin China.

† PHYSUNIO MICROPTERUS Morelet.

* *Unio micropterus* MORELET, Jl. de Conch., XIV, 1866, p. 63; Ser. Conch., IV, 1875, p. 349, pl. XV, fig. 7.—* PÆTEL, Conch. Sam., III, 1890, p. 158.

Siam; Cambodia.

PHYSUNIO SEMIALATUS Deshayes and Julien.

* *Unio semialatus* DESHAYES and JULIEN, N. Arch. Mus., X, 1874, p. 123, pl. VI, figs. 1, 2.[1]

Siam; Cambodia.

† PHYSUNIO CAMBODIENSIS Lea.[2]

* *Unio cambodiensis* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 103; Jl. Acad. N. Sci. Phil., III, 1857, p. 313, pl. XXX, fig. 28; Obs., VI, 1857, p. 33, pl. XXX, fig. 28.

* *Margaron* (*Unio*) *cambodiensis* LEA, Syn., 1870, p. 42.

Takrong River at Korat, Cambodia.

Section LENS Simpson, 1900.

(Type, *Unio eximius* Lea.)

Shell sublenticular; three laterals of left valve distinct; cavity of the beaks compressed.

† PHYSUNIO EXIMIUS Lea.

* *Unio eximius* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 93; Obs., VI, 1857, p. 14, pl. XXV, fig. 8; Jl. Ac. N. Sci. Phila., III, 1858, p. 294, pl. XXV, fig. 8.—* VON MARTENS, Pr. Zool. Soc. Lond., 1860, p. 15.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXIX, fig. 481.—* PÆTEL, Conch. Sam., III, 1890, p. 152.

* *Margaron* (*Unio*) *eximius* LEA, Syn., 1870, p. 28.

Unio semiquadrata SOWERBY, Conch. Icon., XVI, 1866, pl. XLVIII, fig. 258.

* *Unio semiquadratus* PÆTEL, Conch. Sam., III, 1890, p. 167.

Siam; Cambodia.

PHYSUNIO VELARIS Sowerby.

* *Unio velaris* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXII, fig. 368.[3]—* PÆTEL, Conch. Sam., III, 1890, p. 171.

Assam.

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[1] Fischer believes that the above equals *U. micropterus* Morelet (Cat., p. 142). I feel sure he is wrong, and that this is a valid species.

[2] I have only seen the type of this, a very young shell, but it probably belongs to the *graridus* group.

[3] A compressed shell of a uniform yellow color, probably only a variety of *eximius*.

Genus DALLIELLA Simpson 1900.

(Type *Anodonta purpurea* Valenciennes.[1])

Shell subtrapezoidal, generally thin, inflated, with a low, rounded posterior ridge and rather full beaks which have somewhat zigzagged radial sculpture, with a row of chevron-shaped folds running some distance down the posterior ridge, and with fine corrugations in front of the beaks; epidermis somewhat cloth-like; substance of the shell of a peculiar purplish-brown tint; hinge line narrow; teeth imperfectl developed, sometimes reduced to mere rudiments, when present consisting of greatly compressed, feeble, pseudocardinals and laterals; beak cavities rather shallow; dorsal scars one to a few, scattered; muscle scars faint; prismatic border wide.

Animal unknown.

(Group of *Dalliella purpurea*.)

Shell not biangulate behind, rather smooth; nacre coppery purple; teeth very faint, compressed.

† DALLIELLA PURPUREA Valenciennes.

**Anodonta purpurea* VALENCIENNES, Rec. Obs. Zool., II, 1833, p. 236, pl. XLVIII bis, figs. 3, 3*a*, 3*b*.—* HANLEY, Test. Moll., 1842, p. 218.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* VON MARTENS, Mal. Bl., XIV, 1866, p. 12.—* CLESSIN, Conch. Cab. Ano., 1876, p. 77, pl. XIX, fig. 1.—* PÆTEL, Conch. Sam., III, 1890, p. 183.

**Margarita* (*Anodonta*) *purpurea* LEA, Syn., 1836, p. 51; 1838, p. 30.

**Anodon purpurea* CATLOW and REEVE, Conch. Nom., 1845, p. 67.

**Margaron* (*Anodonta*) *purpurea* LEA, Syn., 1852, p. 50; 1870, p. 79.

* † *Anodonta burroughiana*, LEA, Tr. Am. Phil. Soc., V, 1834, p. 105, pl. XVI, fig. 49; * Obs., I, 1834, p. 217, pl. XVI, fig. 49.—* CLESSIN, Conch. Cab. Ano., 1875, p. 164, pl. LIV, figs. 3, 4.—* PÆTEL, Conch. Sam., III, 1890, p. 177.

* *Margaron* (*Anodonta*) *burroughana*, LEA, Syn., 1870, p. 81.

* *Anodon burroughianus*, SOWERBY, Conch. Icon., XVII, 1870, pl. XXVII, fig. 103.

* † *Margarita* (*Unio*) *bengalensis* LEA, Syn., 1836, p. 26; 1838, p. 20.

* *Unio bengalensis* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 3, pl. II, fig. 3; * Obs., II, 1838, p. 3, pl. II, fig. 3.—* TROSCHEL, Arch. für Nat., V, 1839, pl. II, p. 233.—* HANLEY, Test. Moll., 1842, p. 194; * Biv. Shells, 1843, p. 194, pl. XXI, fig. 50.—* CATLOW and REEVE, Conch. Nom., 1845, p. 56.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* CHENU, Ill. Conch., 1858, pl. XXII, figs. 2, 2*a*, 2*b*.—* KUSTER, Conch. Cab. Unio, 1861, p. 228, pl. LXXVII, figs. 2, 3.—* PÆTEL, Conch. Sam., III, 1890, p. 146.

* *Margaron* (*Unio*) *bengalensis* LEA, Syn., 1852, p. 30; 1870, p. 47.

* *Anodon bengalensis* SOWERBY, Conch. Icon., XVII, 1867, pl. XIV, fig. 49.

* *Anodonta bengalensis* CLESSIN, Conch. Cab. Ano., 1876, p. 173, pl. LVII, fig. 1.—* PÆTEL, Conch. Sam., III, 1890, p. 177.

* † *Unio verecundus* GOULD, Pr. Bost. S. N. Hist., III, 1850, p. 295; * U. S. Expl. Exp., XII, 1852, p. 431, figs. 541, 541*a*, 541*b*, 541*c*; * Otia Conch., 1862, p. 89.—

[1] Some of the species placed here have been classed with *Anodonta*, but almost any large series of specimens of any species will show variation from edentulous to toothed forms.

* REEVE, Conch. Icon., XVI, 1865, pl. XXV, fig. 125.—* PÆTEL, Conch. Sam., III, 1890, p. 171.

* *Unio mauritianus* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 152; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 257, pl. XL, fig. 138; * Obs., VII, 1860, p. 75, pl. XL, fig. 138.

* *Margaron* (*Unio*) *mauritianus* LEA, Syn., 1870, p. 42.

* ? *Anodonta heldii* KUSTER, Conch. Cab. Ano., 1873, p. 64, pl. XIX, fig. 1.

Anodonta chinensis KUSTER? Where?

Philippines. The localities India and Mauritius given for this species are no doubt erroneous.

† DALLIELLA CREPERA Lea.

* *Anodonta crepera* LEA, Pr. Zool. Soc. Lond., 1850, p. 198; * Ann. and Mag., VIII, 1851, p. 494.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 502.—* LEA, Jl. Ac. N. Sci. Phila., IV, 1860, p. 238, pl. LXXXIV, fig. 117; * Obs., VII, 1860, p. 56, pl. XXXIV, fig. 117.—* CLESSIN, Conch. Cab. Ano., 1873, p. 97, pl. XXIX, figs. 5, 6.—* PÆTEL, Conch. Sam., III, 1890, p. 178.

* ? *Anodon creperus* SOWERBY, Conch. Icon., XVII, No. 16.

Margaron (*Anodonta*) *crepera* LEA, Syn., 1852, p. 50; 1870, p. 80.

Luzon Island, Philippines.

† DALLIELLA TENUIS Lea.

* *Anodonta tenuis* LEA, Pr. Zool. Soc. Lond., 1850, p. 198; * Ann. and Mag., VIII, 1851, p. 494; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 237, pl. XXXIII, fig. 116; * Obs., VII, 1860, p. 55, pl. XXXIII, fig. 116.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* MUSGRAVE, Phot. Conch., 1863, pl. I, fig. 8.—* CLESSIN, Conch. Cab. Ano., 1873, p. 99, pl. XXX, figs. 3, 4.—* PÆTEL, Conch. Sam., III, 1890, p. 185.

* *Margaron* (*Anodonta*) *tenuis* LEA, Syn., 1852, p. 53; 1870, p. 83.

* *Anodon tenuis* SOWERBY, Conch. Icon., XVI, 1867, pl. XV, fig. 55.

Luzon Island, Philippines.

† DALLIELLA SUBCRASSA Lea.

* *Anodonta subcrassa* LEA, Pr. Zool. Soc. Lond., 1850, p. 198; * Ann. and Mag., VIII, 1851, p. 495; * Jl. Ac. N. Sci. Phila., IV, 1859, p. 236, pl. XXXIII, fig. 115; * Obs., VIII, 1860, p. 54, pl. XXXIII, fig. 115.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* MUSGRAVE, Phot. Conch., 1863, pl. I, fig. 3.—* CLESSIN, Conch. Cab. Ano., 1873, p. 98, pl. XXXI, figs. 1, 2.—* PÆTEL, Conch. Sam., III, 1890, p. 185.

* *Margaron* (*Anodonta*) *subcrassa* LEA, Syn., 1852, p. 51; 1870, p. 81.

* *Anodon subcrassa* SOWERBY, Conch. Icon., XVII, 1867, pl. XIII, fig. 42.

Luzon.

† DALLIELLA GRACILIS Lea.

* *Anodonta gracilis* LEA, Pr. Zool. Soc. Lond., 1850, p. 197; * Ann. and Mag., VIII, 1851, p. 193; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 239, pl. XXXIV, fig. 119; * Obs., VII, 1860, p. 57, pl. XXXIV, fig. 119.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* CLESSIN, Conch. Cab. Ano., 1873, p. 99, pl. XXIX, figs. 3, 4.—* PÆTEL, Conch. Sam., III, 1890, p. 180.

* *Margaron* (*Anodonta*) *gracilis* LEA, Syn., 1852, p. 51; 1870, p. 82.

Dingle, Isle of Panay, Philippines.

DALLIELLA SERRADELLI Drouet.

* *Unio serradelli* DROUET, Jl. de Conch., XL, 1892, p. 86.

Philippines.

(Group of *Dalliella insularis*.)

Shell subsolid, subrhomboidal biangulate behind, pseudocardinals and laterals blurred, not greatly compressed; nacre lurid, tinged purplish.

† DALLIELLA INSULARIS Drouet.

* *Pseudodon insularis* DROUET, Rev. Biol. Fr., VI, 1894, p. 217, fig. 2.

Borneo; Palawan Island, Philippines.

† DALLIELLA CRASSA Drouet.

* *Pseudodon crassus* DROUET, Jl. de Conch., XL, 1892, p. 93.—*DROUET and CHAPER, Mém. Soc. Zool. de Fr., V, 1892, p. 151, pl. VI, figs. 1–3.

Borneo.

The following is an unfigured species.

* *Unio semmelinki* VON MARTENS, Sitzber. Ges. Nat. Fr. Ber., 1891, p. 111.

Southeast Borneo. Possibly a *Dalliella*.

Genus PSEUDODON Gould, 1844.

(Type, *Anodon salwiniana* Gould.)

Pseudodon GOULD, Pr. Bost. Soc. Nat. His., 1844, p. 161.
Monodontina CONRAD, Pr. Ac. N. Sci. Phila., 1853, p. 269.
Trigonodon CONRAD, Am. Jl. Conch., I, 1865, p. 233.
Monocondylus MORELET, Rev. et Mag., 1866, p. 167.
Pseudodus DE MORGAN, Bull. Soc. Zool. Fr., X, 1885, p. 422.

Shell oval to elongate, having two posterior ridges and often one or two slight, radiating elevations above on the posterior slope, above which there is usually a small wing; beaks rather low, sculpture unknown;[1] epidermis dark, often having a few faint wrinkles on the posterior slope, without rays when adult. There is a single, smooth tooth in each valve, with occasional vestiges of a second; laterals nearly or quite wanting; beak cavities shallow; dorsal scars conspicuous, deep, distinct, 4 to 7 in a row under the hinge; anterior scars irregular; nacre generally dull and lurid.

Animal[2] having the branchiæ wide and rounded behind, becoming

[1] One or two authors in describing species say that the beaks are entirely smooth. It is probable that in most cases they have zigzag radial sculpture. Although I have examined a large number of shells belonging to the group, many of which were young, they were all so badly eroded that the beak sculpture was entirely destroyed.

[2] Deshayes and Julien figure but do not describe the animal of *P. moreleti* in Nouv. Arch. de Mus., X, pl. V. I am only able to make out part of the characters from this really excellent figure.

narrow in front; palpi enormously long, apparently slender, pointed behind, where they project free for some distance; mantle thin, with a wide, slightly thickened border, faintly papillose behind, there seeming to be but little distinction between anal and branchial openings; anal opening apparently smooth.

Section **SUBORBICULUS** Simpson, 1900.

(Type, *Monocondylus orbicularis* Morelet.)

Shell compressed, nearly round in outline, feebly biangulate, and having a posterior dorsal wing; beaks low; hinge with a single, compressed, smooth, slightly curved, triangular tooth in each valve.

PSEUDODON ORBICULARIS Morelet.

* *Monocondylus orbicularis* MORELET, Rev. et Mag., XVIII, 1866, p. 167.
* *Pseudodon orbicularis* MORELET, Ser. Conch., IV, 1875, p. 338, pl. XVI, fig. 5.
* *Monocondylæa orbicularis* PÆTEL, Conch. Sam., III, 1890, p. 174.

Siam; Cambodia.

Section **TRIGONODON** Conrad, 1865.

Shell solid, compressed, rhomboid, round in front, widely and faintly biangulate and rough behind; surface irregularly concentrically wavy sulcate; hinge with a strong triangular pseudocardinal in the right valve, having a decided excavation behind it, and at the posterior side of the pit a faint tooth; there is one strong triangular tooth in the left valve and a vestige of one in front of it at the upper edge of the shell; anterior scars irregular; dorsal scars crowded close to the hinge line.

(Type, *Monocondylæa crebristriata* Anthony.)

†**PSEUDODON CREBRISTRIATUS** Anthony.

* *Monocondylæa crebristriata* ANTHONY, Am. Jl. Conch., I, 1865, p. 205, pl. XVIII, fig. 1.—* PÆTEL, Conch. Sam., III, 1890, p. 174.
* *Trigonodon crebristriata* CONRAD, Am. Jl. Conch., I, 1865, p. 233.
* *Margaron* (*Monocondylæa*) *crebristriata* LEA, Syn., 1870, p. 72.
* *Unio crebristriatus* SOWERBY, Conch. Icon., XVI, 1868, pl. XCV, fig. 517.
* *Pseudodon crebristriatum* HANLEY and THEOBALD, Conch. Ind., 1876, p. 5, pl. IX, fig. 3.
* *Unio vondembuschii* SOWERBY, Conch. Icon., XVI, 1868, pl. XCV, fig. 518.

†**PSEUDODON CREBRISTRIATUS** var. **PEGUENSIS** Anthony.[1]

* *Monocondylæa peguensis* ANTHONY, Am. Jl. Conch., I, 1865, p. 205, pl. XVIII, fig. 2.—* PÆTEL, Conch. Sam., III, 1890, p. 174.
* *Margaron* (*Monocondylæa*) *peguensis* LEA, Syn., 1870, p. 73.
* *Pseudodon crebristriatum* var. *peguensis* HANLEY and THEOBALD, Conch. Ind., 1876, p. 5, pl. IX, fig. 5.

Burma; Pegu; Cambodia?.

[1]Typically quite different from *P. crebristriatus*, but our large series seems to show an almost complete connection.

Section **PSEUDODON** Gould. 1844.

(Type, *Anodon Salwimana* Gould.)

Characters given under generic name.

(Group of *Pseudodon harmandi.*)

Shell rather small, solid, rhomboid, short, inflated; posterior ridge high, only slightly biangulate, faintly corrugated, on the posterior slope.

† **PSEUDODON HARMANDI** Crosse and Fischer.

* *Pseudodon harmandi* CROSSE and FISCHER, Jl. de Conch., XXIV, 1876, p. 331, pl. X, fig. 2.

* *Monocondylæa harmandi* P.ETEL, Conch. Sam., III, 1890, p. 174.

Cambodia.

PSEUDODON AUREUS Heude.

* *Pseudodon aureus* HEUDE, Conch. Fluv. Nank., IX, 1885, pl. LXXII, fig. 140.

* *Margaritana aurea* P.ETEL, Conch. Sam., III, 1890, p. 172.

China.

(Group of *Pseudodon vondembuschianus.*)

Shell rather large, somewhat compressed, subsolid, elliptic-rhomboid, wider behind, where it is widely biangulate; teeth compressed.

† **PSEUDODON VONDEMBUSCHIANUS** Lea.

* *Margaritana vondembuschiana* LEA, Pr. Am. Phil. Soc., I, 1840, p. 288; *Tr. Am. Phil. Soc., VIII, 1842, p. 222, pl. XVIII, fig. 39; * Obs., III, 1842, p. 60, pl. XVIII, fig. 39.—* KUSTER, Conch. Cab. Unio, 1862, p. 295, pl. XCVIII, fig. 3.

* *Margaron* (*Monocondylæa*) *vondembuschiana* LEA, Syn., 1852, p. 45; 1870, p. 73.

* *Monocondylæa vondembuschiana* H. and A. ADAMS, Gen. Rec. Moll., II, 1858, p. 501.—* P.ETEL, Conch. Sam., III, 1890, p. 175.

* *Pseudodon vondembuschiana* CONRAD, Am. Jl. Conch., I, 1865, p. 233.

* *Monodontina buschiana* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, pp. 269, 449.

* *Unio von buschea* SOWERBY, Conch. Icon., XVI, 1866, pl. LI, fig. 269.

* *Alasmodonta crispata* MOUSSON, L. and Suss. W. Moll. Java, 1849, p. 97, pl. XVIII, figs. 1, 2.

* *Margaritana crispata* P.ETEL, Conch. Sam., III, 1890, p. 173.

† * *Monocondylæa planulata* LEA, Pr. Ac. N. Sci. Phila., XI, 1859, p. 187; * Jl. Ac. N. Sci. Phila., IV, 1859, p. 262, pl. XLII, fig. 142; * Obs., VII, 1860, p. 80, pl. XLII, fig. 142.—* ? KUSTER, Conch. Cab. Unio, 1862, p. 305, pl. C, fig. 8.

* *Pseudodon planulata* CONRAD, Am. Jl. Conch., I, 1865, p. 233.

* *Microcondylæa planulata* P.ETEL, Conch. Sam., III, 1890, p. 175.

* *Margaron* (*Monocondylæa*) *planulata* LEA, Syn., 1870, p. 73.

* *Margaritana fragilis* KUSTER, Conch. Cab. Unio, 1862, p. 295, pl. XCVIII, fig. 2.

* *Microcondylæa fragilis* P.ETEL, Conch. Sam., III, 1890, p. 175.

* *Monocondylæa rhombica* KUSTER, Conch. Cab. Unio, 1862, p. 304, pl. C, fig. 7.

Java; Sumatra; Borneo; Malacca.

† **PSEUDODON ELLIPTICUM** Conrad.

* *Pseudodon ellipticum* CONRAD, Am. Jl. Conch., I, 1865, p. 352, pl. XXV, fig. 1.

Cambodia.

† PSEUDODON ZOLLINGERI Mousson.

**Alasmodonta zollingeri* MOUSSON, L. and Suss. Moll. Java, 1849, p. 96, pl. XVIII, fig. 1.
**Margaritana zollingeri* KUSTER, Conch. Cab. Unio, 1862, p. 294, pl. XCVIII, fig. 1.
**Pseudodon zollingeri* MORELET, Ser. Conch., IV, 1875, p. 337.
**Monocondylæa zollingeri* PÆTEL, Conch. Sam., III, 1890, p. 174.

Java.

† PSEUDODON INOSCULARIS Gould.

* *Anodon inoscularis* GOULD, Pr. Bost. Soc. N. H., I, 1844, p. 160.[1]—* HANLEY and THEOBALD, Conch. Ind., 1876, p. 5, pl. IX, fig. 2.
**Margaron* (*Monocondylæa*) *inoscularis* LEA, Syn., 1870, p. 73.
**Margaritana inoscularis* PÆTEL, Conch. Sam., III, 1890, p. 173.

River Salwen, British Burma.

† PSEUDODON CUMINGII Lea.

**Anodonta cumingii* LEA, Pr. Zool. Soc. Lond., 1850, p. 199; *Ann. and Mag., VIII, 1851, p. 495.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 502.—*MUSGRAVE, Phot. Conch., 1863, pl. I, fig. 6.—*PÆTEL, Conch. Sam., III, 1890, p. 178.
**Margaron* (*Monocondylæa*) *cumingii* LEA, Syn., 1852, p. 50; 1870, p. 73.
* *Monocondylæa cumingii* LEA, Jl. Ac. N. Sci. Phila., IV, 1860, p. 235, pl. XXXIII, fig. 114; *Obs., VII, 1860, p. 53, pl. XXXIII, fig. 114.
**Pseudodon cumingii* CONRAD, Am. Jl. Conch., I, 1865, p. 233.
**Anodon cumingii* REEVE, Conch. Icon., XVII, 1870, pl. XXXI, fig. 122.
**Microcondylæa cumingii* CLESSIN, Conch. Cab. Ano., 1876, p. 259, pl. LXXXIII, figs. 3, 4.—* PÆTEL, Conch. Sam., III, 1890, p. 175.
**Pseudodus cumingii* DE MORGAN, Bull. Soc. Zool. de Fr., X, 1885, p. 422.

Malacca; Perak; Siam; Cambodia.

† PSEUDODON ÆNEOLUS Drouet.

**Pseudodon æneolus* DROUET, Jl. de Conch., XL, 1892, p. 94.—*DROUET and CHAPER, Mem. Soc. Zool. de Fr., V, 1892, p. 152, pl. VI, figs. 4–7.

Borneo.

† PSEUDODON TUMIDUS Morelet.

* *Monocondylus tumidus* MORELET, Jl. de Conch., XIV, 1866, p. 62.—* MABILLE, Rev. Zool., XXIII, 1872, p. 51, pl. V, figs. 6, 7.
* *Pseudodon tumidus* MORELET, Ser. Conch., IV, 1875, p. 337, pl. XVI, fig. 1.

Siam; Cambodia.

PSEUDODON OVALIS Morlet.

* *Pseudodon ovalis* MORLET, Jl. de Conch., XXXVII, 1889, p. 197, pl. VII, fig 3.

Srakeo River, Siam.

[1]Gould did not figure this, but the figure in the Conchologia Indica accurately represents his species, judging from a cotype in Lea's collection, sent him by Dr. Gould. A number of these Pseudodons are very close, and it is quite probable that some of them must be united when sufficient material is studied.

PSEUDODON THOMSONI Morlet.

* *Pseudodon thomsoni* MORLET, Jl. de Conch., XXXII, 1884, p. 401, pl. XIII, figs. 2, 2*a*.

* *Margaritana thomsoni* P.ETEL, Conch. Sam., III, 1890, p. 174.

Cambodia.

† PSEUDODON SALWENIANUS Gould.

* *Anodon salweniana* GOULD, Pr. Bost. Soc. N. Hist., I, 1844, p. 160.

* *Anodonta salweniana* GOULD, Otia Conch., 1862, p. 193.

* *Pseudodon salweniana* CONRAD, Am. Jl. Conch., I, 1865, p. 233.

* *Monocondylæa salweniana* P.ETEL, Conch. Sam., III, 1890, p. 174.

* *Unio salwenianus* SOWERBY, Conch. Icon., XVI., 1868, pl. XCIV, fig. 513.

* *Margaron* (*Monocondylæa*) *salweniana* LEA, Syn., 1870, p. 72.

* *Pseudodon salwenianum* HANLEY and THEOBALD, Conch. Ind., 1876, p. 5, pl. IX, fig. 4.

* *Unio salwenianus* P.ETEL, Conch. Sam., III, 1890, p. 166.

River Salwen, British Burma.

† PSEUDODON MORELETI Crosse and Fischer.

* *Monocondylæa tumida* DESHAYES and JULLIEN, Nouv. Arch. de Mus., X, 1874, p. 117, pl. V, figs. 1–3.[1]

* *Pseudodon moreleti* CROSSE and FISCHER, Jl. de Conch., XXV, 1876, p. 330.

Cambodia.

† PSEUDODON CAMBODJENSIS Petit.

* *Monocondylæa cambodjensis* PETIT, Jl. de Conch., VI, 1865, p. 122.—* P.ETEL, Conch. Sam., III, 1890, p. 174.

* *Margaron* (*Monocondylæa*) *cambodjensis* LEA, Syn., 1870, p. 72.

* *Pseudodon cambodjensis* CONRAD, Am. Jl. Conch., I, 1865, p. 233.—* MORLET, J. de Conch., XXXII, 1866, p. 266.

Cambodia; Tonkin.

PSEUDODON CHAPERI de Morgan.

* *Pseudodus chaperi* DE MORGAN, Bull. Soc. Zool. de Fr., X, 1885, p. 423, pl. IX, figs. 1, 2.

Cambodia; Siam.

The following species is unfigured:

PSEUDODON NICOBARICUS Mörch.

Alasmodonta (subg.?) *nicobarica* MÖRCH, Jl. de Conch., XX, 1872, p. 327.[2]

Nicobar Islands.

[1] This fine, large shell which Deshayes and Jullien supposed to be *P. tumidus* of Morelet is quite a different thing, and Crosse and Fischer have given it a new name.

[2] Mörch describes the above under the name *Alasmodonta* (subgenus?) *nicobarica*, and credits it to Fabricius. The *Mytilus nicobaricus* of the latter was only a *nomen nudum*. Mörch says his species is close to *Anodonta zollingeri*.

Section **BINEURUS** Simpson, 1900.

Shell elongate rhomboid, thin, rounded in front, widely and feebly biangulate behind, having two or more raised radiating lines on the posterior slope, which is somewhat obliquely wrinkled; beaks low; surface finely, irregularly, concentrically grooved; epidermis olive; teeth smooth, compressed; nacre bluish. Animal unknown.

(Type, *Monocondylæa mouhoti* Lea.)

†PSEUDODON MOUHOTI Lea.

* *Monocondylæa mouhoti* LEA, Pr. Ac. N. Sci. Phila., VII, 1863, p. 190.
* *Pseudodon manhoti* CONRAD, Am. Jl. Conch., I, 1865, p. 233.
* *Monocondylæa mouhotiana* LEA, Jl. Ac. N. Sci. Phila., VI, 1866, p. 65, pl. XXI, fig. 62; * Obs., XI, 1867, p. 69, pl. XXI, fig. 62.—* Clessin, Conch. Cab. Ano., 1876, p. 261, pl. LXXXII, figs. 1, 2.—* P.ETEL, Conch. Sam., III, 1890, p. 175.
* *Margaron (monocondylæa) mouhotiana* LEA, Syn., 1870, p. 73.
* *Unio mouhotianus* SOWERBY, Conch. Icon., XVI, 1868, pl. XCII, fig. 503.
* *Pseudodon mouhotianus* MORELET, Ser. Conch., IV, 1875, p. 339.

Cambodia; Siam.

PSEUDODON EXILIS Morelet.

* *Monocondylus exilis* MORELET, Jl. de Conch., XIV, 1866, p. 63.
* *Pseudodon exilis* MORELET, Ser. Conch., IV, 1875, p. 340, pl. XVII, fig. 1.

Perak.

PSEUDODON AVA Theobald.

* *Monocondylæa ava* THEOBALD, Jl. As. Soc. Beng., XLII, Pt. 2, 1873, p. 209, pl. XVII, fig. 15.[1]

Mandelay, Burma.

Section **NASUS** Simpson, 1900.

(Type, *Pseudodon nankingensis* Heude.)

Shell somewhat solid, rather inflated, much elongated, with a well-developed posterior ridge, with a low, faint one above it, bluntly pointed at post-basal part; beaks not high, eroded in the specimens seen; epidermis dark; teeth compressed, high.[2]

Animal unknown.

†PSEUDODON NANKINGENSIS Heude.

* *Monocondylæa nankingensis* HEUDE, Jl. de Conch., XXII, 1874, p. 116; Conch. Fluv. Nank., I, 1875, pl. IV, fig. 9.
* *Monocondylæa nankingensis* P.ETEL, Conch. Sam., III, 1890, p. 174.

Rivers of Nankin.

[1] I am not certain that this belongs in this group.

[2] I have seen only a single shell of each of the two species of this group, both very badly eroded and decayed, so that I can not give the characters accurately. The animals may show that they are not closely related to the ordinary Pseudodons.

† PSEUDODON SECUNDUS Heude.

* *Pseudodon secundus* HEUDE, Conch. Fluv. Nank., III, 1877, pl. XVIII, fig. 38.
Unio secundus P.ÆTEL, Conch. Sam., III, 1890, p. 167.

River Hoæ, China.

Section OBOVALIS Simpson, 1900.

(Type, *Pseudodon loomisi* Simpson.)

Shell obovate subinflated, with a low, rounded posterior ridge, and with radiating wrinkles on the posterior slope; disk nearly free from wrinkles; epidermis blackish; there is a high, triangular tooth in each valve; laterals very faint, rounded; nacre coppery.

Animal unknown.

† PSEUDODON LOOMISI Simpson.

* *Pseudodon loomisi* SIMPSON, Pr. Ac. N. Sci. Phila., 1900, p. 84, pl. IV, fig. 7.

Japan.

The following are unfigured or indeterminate species.

Monocondylæa walpolei HANLEY, Proc. Zool. Soc. Lond., 1871, p. 587. Borneo.
Spatha compressa VON MARTENS, Proc. Zool. Soc. Lond., 1860, p. 66. Siam.
Pseudodon sulcatum ROCHEBRUNE, Bull. Soc. Phil., 7th ser., VI, 1882, p. 41. Mekong River, Cochin China.
Pseudodon pierri ROCHEBRUNE, Bull. Soc. Phil., VI, 1882, p. 41. Cochin China.
Pseudodon mabillei ROCHEBRUNE, Bull. Soc. Phil., VI, 1882, p. 41. Cochin China, Cambodia.
Pseudodon anodontinus ROCHEBRUNE, Bull. Soc. Phil., VI, 1882, p. 41. Cambodia.

Genus PARREYSIA Conrad, 1853.

(Type, *Unio multidentatus* Philippi.)

Parreysia CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 267.[1]

Shell solid, inflated, oval to subrhomboid, with full, high, zigzag, radially sculptured beaks, the sculpture often extending over the disk; epidermis smooth and bright, sometimes a little rayed, with two irregular pseudocardinals in the left valve which are more or less broken into ragged denticles or are strongly, vertically striate, and two laterals, the lower the larger; right valve with one, sometimes two pseudocardinals, the upper small, compressed, and a few tubercles behind them, with two laterals, the upper the larger; cavity of the beaks rather deep, not compressed; dorsal scars under the hinge, not visible; the two upper anterior muscle scars very deep, confluent, the lower linear; nacre white to salmon, iridescent behind.

Animal unknown.

Subgenus PARREYSIA Conrad, 1853.

Characters the same as the genus.

[1] In the above reference Conrad gives the name *Parreysia* and refers to *Unio multidentatus* Parreyss, which may be taken as the type. I do not know that he ever described the group.

(Group of *Parreysia corrugata.*)

Shell having the middle of the basal region swollen, beak sculpture strong, the central ridges generally united at their lower points to form chevron-shaped markings.

† PARREYSIA CORRUGATA Müller.

* *Mya corrugata* MÜLLER,[1] Verm. Terr. et Fluv., 1774, Pt. 2, p. 214; * Besch. Ges. Nat. Ber., IV, 1779, p. 56, pl. III*b*, figs. 7, 8.—*GMELIN,[2] Sys. Nat., 13th ed., 1788, p. 3221.—* SCHROTER, Fluss, Conch., 1779, p. 181, pl. IX, fig. 3.—* WOOD, Gen. Conch., I, 1815, p. 108, pl. XXIV, figs. 1–3.—* DILLWYN, Cat., I, 1817, p. 52.—MAWE, Linn. Conch., 1823, pl. IV, fig. 3.—* WOOD, Ind. Test., 1825, p. 12, pl. II, fig. 31 *a;* 1856, rev. ed., p. 16, pl. II, fig. 31.

* *Unio corrugata* LAMARCK,[3] An. sans Vert., VI, 1819, p. 78.—* DESHAYES, Enc. Meth., II, 1827, p. 584, pl. CCXLVIII, fig. 8.

* *Unio* (*Potamida*) *corrugata* SWAINSON, Tr. on Mal., 1840, p. 268, fig. 51; p. 281, fig. 57.

* *Unio corrugata* RETZIUS, Diss. Hist. Nat., 1778, p. 18.—* SPENGLER, Skriv. Selsk. Nat., III, 1793, p. 68.—* HANLEY, Test. Moll., 1842, p. 197; * Biv. Shells, 1843, p. 197.—* CATLOW and REEVE, Conch. Nom., 1845, p. 57.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, pp. 493, 497.—* KUSTER, Conch. Cab. Unio, 1862, p. 289, pl. XCVII, figs. 3, 4.—* BLANFORD, Jl. As. Soc. Beng., XXXV, 1867, p. 136.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXI, fig. 360.—* HANLEY and THEOBALD, Conch. Ind., 1876, p. 21, pl. XLV, figs. 2–5.—* P.ETEL, Conch. Sam., III, 1890, p. 149.

* *Margarita* (*Unio*) *corrugatus* LEA, Syn., 1836, p. 29; 1838, p. 21.

* *Margaron* (*Unio*) *corrugatus* LEA, Syn., 1852, p. 20; 1870, p. 30.

* *Mya spuria* GMELIN, Syst. Nat., 13th ed., 1788, p. 3 22; * WOOD, Gen. Conch., I, 1815, p. 110.—* LAMARCK, An. sans Vert., VI, 1819, p. 80.

Mya gaditana SCHREIBERS, Versuch., 1793, p.

* *Unio multidentatus* PHILIPPI,[4] Conch., III, 1847, p. 46, pl. III, fig. 4.—* KUSTER, Conch. Cab. Unio., 1856, p. 136, pl. XXXVI, fig. 5.—* P.ETEL, Conch. Sam., III, 1890, p. 160.

* *Margaron* (*Unio*) *multidentatus* LEA, Syn., 1870, p. 50.

* *Unio fulminens* PHILIPPI,[5] Conch., III, 1847, p. 46, pl. III, figs. 5, 6.—* KUSTER, Conch. Cab. Unio., 1862, p. 286, pl. XCVI, figs. 2, 3.—* P.ETEL, Conch. Sam., III, 1890, p. 153.

* *Unio lutens* LEA,[6] Pr. Ac. Nat. Sci. Phila., VIII, 1856, p. 93.

* *Unio luteus* LEA, Jl. Ac. N. Sci. Phila., III, 1857, p. 291., pl. XXIV, fig. 4; * Obs., VI, 1857, p. 11, pl. XXIV, fig. 4.

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[1] Müller's description of *Mya corrugata* is inadequate, but in the Beschaftigungen it is further discussed and characteristic figures are given of the species we know as *Unio corrugatus* of India.

[2] Refers to Conch. Cab. VI, pl. III, fig. 22, which is probably Müller's shell. Chemnitz refers to it as *Mya corrugata teste orali*, etc. The shell referred to by him in Conch. Cab., X, p. 346, as *Mya corrugata magna*, etc., is a very different thing.

[3] Lamarck refers to Enc. Meth. Pt. 19, 1797, pl. CCXLVIII, figs. 6, 8 *a*, *b*. I am not at all sure that fig. 6 is the *corrugatus* of Müller.

[4] Credited by Philippi to Parreyss. I think there can be no doubt that this is the *Mya corrugata* of Müller, as the figure and description entirely agree with the species as we know it.

[5] Parreyss is the author, according to Philippi. This and *multidentatus* are credited by Philippi to Australia. No shells like these have ever been found there.

[6] *Lutens* in text, by error no doubt.

* *Margaron (Unio) luteus* LEA, Syn., 1870, p. 46.

* ? *Unio semirugatus* CHENU, Ill. Conch., 1858, pl. XII, figs. 2, 2*a*.

* *Unio merodabensis* KUSTER, Conch. Cab. Unio, 1861, p. 233, pl. LXXVIII, fig. 4.—* BLANFORD, J. As. Soc. Beng., XXXV, 1866, p. 142.—* PÆTEL, Conch. Sam., III, 1890, p. 159.

* *Unio wynegungœnsis* HANLEY and THEOBALD,[1] Conch. Ind., 1876, p. 21, pl. XLV, fig. 6.

* *Unio tennenti* HANLEY and THEOBALD, Conch. Ind., 1876, p. 22, pl. XLV, figs. 7–9.—* PÆTEL, Conch. Sam., III, 1890, p. 169.

* *Unio phayresi* THEOBALD, manuscript.

PARREYSIA CORRUGATA var. LÆVIROSTRIS Benson.

* *Unio lævirostris* BENSON, Ann. and Mag., 1862, p. 192; * Jl. As. Soc. Beng., 1862, XXXV, p. 144.—* PÆTEL, Conch. Sam., III, 1890, p. 157.

* *Unio corrugatus* var. *lævirostris* HANLEY and THEOBALD, Conch. Ind., 1876, p. 21, pl. XLIV, figs. 5, 6.—* PÆTEL, Conch. Sam., III, 1890, p. 149.

† PARREYSIA CORRUGATA var. NAGPOORENSIS Lea.

* *Unio nagpoorensis* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 331; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 270, pl. XLV, fig. 150; * Obs., VII, 1860, p. 88, pl. XLV, fig. 150.—* BLANFORD, Jl. As. Soc. Beng., XXXV, 1866, p. 143.

* *Margaron (Unio) nagpoorensis* LEA, Syn., 1870, p. 38.

* *Unio corrugatus* Müll. var. *nagpoorensis* HANLEY and THEOBALD, Conch. Ind., 1876, p. 21.—PÆTEL, Conch. Sam., 1890, p. 149.

India; Burma.?

† PARREYSIA WYNEGUNGÆNSIS Lea.

* *Unio wynegungœnsis* LEA,[2] Pr. Ac. N. Sci. Phila., III, 1859, p. 331; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 271, pl. XLV, fig. 151; * Obs., VII, 1860, p. 89, pl. XLV, fig. 151.—* BLANFORD, Jl. As. Soc. Beng., XXXV, 1866, p. 143.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXVII, p. 339.—* PÆTEL, Conch. Sam., III, 1890, p. 172.

* *Margaron (Unio) wynegungœnsis* LEA, Syn., 1870, p. 50.

Wynegunga River, Bengal.

† PARREYSIA FAVIDENS Benson.

* ? *Mya spuria* Wood, Ind. Test., 1825, p. 12, pl. II, fig. 35*a*.

* *Unio favidens* BENSON,[3] Ann. and Mag., X, 1862, p. 188; * Jl. As. Soc. Beng., XXXV, 1867, p. 138.—* HANLEY and THEOBALD, Conch. Ind., 1876, p. 6, pl. XI, fig. 1.—* REEVE, Conch. Icon., XVI, 1865, pl. XXVI, fig. 131.—* PÆTEL, Conch. Sam., III, 1890, p. 152.

* *Margaron (Unio) favidens* LEA, Syn., 1870, p. 38.

* *Unio flavidens* PÆTEL, Conch. Sam., III, 1890, p. 152.

* *Unio trirostris* MUSGRAVE, Hanley Phot. Conch., 1863, pl. II, fig. 9.—* HANLEY and THEOBALD,[4] Conch. Ind., 1876, p. 6, pl. XI, fig. 6.—* PÆTEL, Conch. Sam., III, 1890, p. 170.

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[1] I think this is *corrugatus* and not the *wynegungœnsis* of Lea.

[2] Heavier, more elongated and pointed behind than *corrugata*, yet probably only a variety of it.

[3] Several varieties, *marcens*, *trigona*, *delta*, *chrysis*, *viridula*, and *densa* are given by Benson, which hardly seem to me to be worth mentioning.

[4] This = *U. tripartitus* of Lea, with a darker epidermis and a more pronounced basal swelling. There is every variation in the coloring and swelling.

† * *Unio tripartitus* LEA, Pr. Ac. N. Sci. Phila., VII, 1863, p. 190; *Jl. Ac. N. Sci. Phila., VI, 1866, p. 57, pl. XIX, fig. 55; * Obs., XI, 1867, p. 61, pl. XIX, fig. 55.

* *Margaron* (*Unio*) *tripartitus* LEA, Syn., 1870, p. 35.[1]

* *Unio faridens* var. *marcens* BENSON, Ann. and Mag., X, 1862, p. 188.

* *Unio marcens* HANLEY and THEOBALD, Conch. Ind., 1876, p. 19, pl. XLII, figs. 4–6.—* P.ETEL, Conch. Sam., III, 1890, p. 158.

* *Unio smaragdites* BENSON, Ann. and Mag., X, 1862, p. 190.—* BLANFORD, Jl. As. Soc. Beng., XXXV, 1866, p. 147.—* HANLEY and THEOBALD, Conch. Ind., 1876, p. 5, pl. X, fig. 5.—* P.ETEL, Conch. Sam., III, 1890, p. 167.

PARREYSIA FAVIDENS var. PINAX Benson.

* *Unio pinax* BENSON, Ann. and Mag., 1862, p. 192; *Jl. As. Soc. Beng., XXXV, 1866, p. 144.

* *Unio faridens* var. *pinax* HANLEY and THEOBALD, Conch. Ind., 1876, p. 6, pl. X, fig. 2.—* P.ETEL, Conch. Sam., III, 1890, p. 152.

PARREYSIA FAVIDENS var. PLAGIOSOMA Benson.

* *Unio plagiosoma* BENSON, Ann. and Mag., X, 1862, p. 191; *Jl. As. Soc. Beng., XXXV, 1866, p. 144.

* *Unio faridens* var. *plagiosoma* HANLEY and THEOBALD, Conch. Ind., 1876, p. 6, pl. XI, fig. 3.—* P.ETEL, Conch. Sam., III, 1890, p. 152.

India.

† PARREYSIA BHAMOENSIS Theobald.

* *Unio bhamoensis* THEOBALD, Jl. As. Soc. Beng., XLII, 1874, Pt. 2, p. 207, pl. XVII, fig. 1.—* ? HANLEY and THEOBALD, Conch. Ind., 1876, p. 62, pl. CLV, fig. 2.—* P.ETEL, Conch. Sam., III, 1890, p. 146.

* † *Unio mandelayensis* THEOBALD, Jl. As. Soc. Beng., XLII, 1874, p. 208, pl. XVII, fig. 2.—* HANLEY and THEOBALD, Conch. Ind., 1876, p. 62, pl. CLIV. fig. 4.—* P.ETEL, Conch. Sam., III, 1890, p. 158.

Burma.

† PARREYSIA FEDDENI Theobald.

* *Unio feddeni* THEOBALD, Jl. As. Soc. Beng., XLII, 1874, p. 208, pl. XVII, fig. 3.[2]

Penugunga River, Central India.

† PARREYSIA TAVOYENSIS Gould.

* *Unio tavoyensis* GOULD, Pr. Bost. Soc. N. Hist., I, 1843, p. 140.—* CATLOW and REEVE, Conch. Nom., 1845, p. 64.—* KUSTER, Conch. Cab. Unio, 1856, p. 166, pl. XLVIII, fig. 2.—* GOULD, Otia Conch., 1862, p. 190.—* REEVE, Conch. Icon., XVI., 1864, pl. XIII, fig. 49.[3]—* BLANFORD, Jl. As. Soc. Beng., XXXV, 1866, p. 148.—* HANLEY and THEOBALD, Conch. Ind., 1876, p. 62, pl. CLIV, figs. 6, 7.—* P.ETEL, Conch. Sam., III, 1890, p. 169.

* *Margaron* (*Unio*) *tavoyensis* LEA, Syn., 1870, p. 31.

* *Unio savoyensis* P.ETEL, Conch. Sam., III, 1890, p. 166.

* *Unio parma* BENSON, Sowerby Conch. Icon., XVI, 1868, pl. XCV, fig. 514.—* HANLEY and THEOBALD, Conch. Ind., 1876, p. 61, pl. CLIV, fig. 1.—* P.ETEL, Conch. Sam., III, 1890, p. 162.

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[1] Lea claims that his species has triple laterals in the left valve. Specimens of *faridens* have the same character, and there is much variation in this particular.

[2] A young specimen in the U. S. National Museum collection from Morelet's collection is a good deal like *P. faridens*.

[3] Gould did not figure this, but Reeve's figure agrees well with the types.

†PARREYSIA TAVOYENSIS var. TRIEMBOLUS Benson.

* *Unio triembolus* BENSON, Jl. As. Soc. Beng., XXXV, 1855, p. 144; *Ann. and Mag., X, 1862, p. 190.—*HANLEY and THEOBALD, Conch. Ind., 1876, p. 43, pl. CVII, fig. 2.—*P.ETEL, Conch. Sam., III, 1890, p. 170.

* † *Unio houngdaranicus* TAPPERONE-CANEFRI, Ann. Mus. Civ., VII, 1889, p. 341.

Burma; India.

†PARREYSIA VULCANA Hanley.

* *Unio vulcanus* HANLEY, Pr. Zool. Soc. Lond., 1875, p. 606.—* HANLEY and THEOBALD, Conch. Ind., 1876, p. 62, pl. CLV, fig. 3.—* P.ETEL, Conch. Sam., III, 1890, p. 172.

Burma; Pegu.

†PARREYSIA FEÆ Tapperone-Canefri.

* *Unio feæ* TAPPERONE-CANEFRI, Ann. Mus. Civ. Gen., 2d ser., VII, 1889, p. 340.[1]

Meetan River, Burma.

†PARREYSIA RAJAHENSIS Lea.

* *Unio rajahensis* LEA, Pr. Am. Phil. Soc., II, 1841, p. 30; * Tr. Am. Phil. Soc., VIII, 1842, p. 239, pl. XXIII, fig. 53; * Obs., III, 1842, p. 77, pl. XXIII, fig. 53.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—*CHENU, Ill. Conch., 1858, pl. XXVI, figs. 3, 3*a*, 3*b*.—* P.ETEL, Conch. Sam., III, 1890, p. 165.

* *Margaron* (*Unio*) *rajahensis* LEA, Syn., 1852, p. 25; 1870, p. 38.

* *Unio indicus* SOWERBY, Conch. Icon., XVI, 1866, pl. XL, fig. 222.—* HANLEY and THEOBALD, Conch. Ind., 1876, p. 43, pl. CVII, fig. 1.

* *Margaron* (*Unio*) *indicus* LEA, Syn., 1870, p. 31.

India.

(Group of *Parreysia rugosa*.)

Shell rather solid, elliptical to subtrapezoidal; beaks full, with zig-zag radial sculpture and fine corrugations and granules over the surface of the shell.

†PARREYSIA RUGOSA Gmelin.

* *Mya rugosa* GMELIN, Syst. Nat., 13th ed., 1788, p. 3222.[2]—* WOOD, Gen. Conch. I, 1815, p. 109.—*DILLWYN, Cat. I, 1817, p. 53.—* WOOD, Ind. Test., 1825, p. 12, pl. II, fig. 33*a*; rev. ed., 1856, p. 16, pl. II, fig. 33.

* *Unio rugosus* KÜSTER, Conch. Cab. Unio, 1862, p. 290, pl. XCVII, fig. 5.—* BLANFORD, Jl. As. Soc. Beng., XXXV, 1867, p. 137.—*P.ETEL, Conch. Sam., III, 1890, p. 166.

Coromandel.

[1] Not figured. Shells in the U. S. National Museum from Fea show this to be a valid species.

[2] Gmelin refers to the *Mya corrugata magna*, etc., of Chemnitz, in the Conch. Cab., X, p. 376, pl. CLXX, fig. 1649. There is a shell in Lea's collection from the Vellaur River, southeast India, which seems to be this species.

†PARREYSIA CORBIS Hanley.

**Unio corbis* HANLEY, Biv. Shells, 1856, p. 386, pl. XXIII, fig. 43.[1]—*HANLEY and THEOBALD, Conch. Ind., 1876, p. 22, pl. XLV, fig. 10.

**Margaron* (*Unio*) *corbis* LEA, Syn., 1870, p. 50.

Assam.

†PARREYSIA BURMANUS Blanford.

**Unio burmanus* BLANFORD, Pr. Zool. Soc. Lond., 1869, p. 449.

**Unio birmanus* HANLEY and THEOBALD, Conch. Ind., 1876, p. 19, pl. XLII, fig. 1.—*P.ETEL, Conch. Sam., III, 1890, p. 146

Burma.

†PARREYSIA SIKKIMENSIS Lea.

**Unio sikkimensis* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 151; *Jl. Ac. N. Sci. Phila., IV, 1859, p. 251, pl. XXXIX, fig. 131; *Obs., VII, 1860, p. 69, pl. XXXIX, fig. 131.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXXVI, fig. 400.—*HANLEY and THEOBALD, Conch. Ind., 1876, p. 6, pl. XI, fig. 4, p. 44, pl. CVII, figs. 6, 7.—*P.ETEL, Conch. Sam., III, 1890, p. 167.

**Margaron* (*Unio*) *sikkimensis* LEA, Syn., 1870, p. 64.

Sikkim, India.

†PARREYSIA GOWHATTENENSIS Theobald.

**Unio gowhattenensis* THEOBALD, Jl. As. Soc. Beng., XLII, 1873, p. 208, pl. XVII, fig. 4.—*P.ETEL, Conch. Sam., III, 1890, p. 154.

Gowhatti, in Assam.

PARREYSIA SIMPULARIS Heude.

**Unio modestus* HEUDE,[2] Conch. Fluv. Nank., II, 1877, pl. XIV, fig. 29.

**Unio simpularis* HEUDE, Jl. de Conch., XXXII, 1884, p. 20.—*P.ETEL, Conch. Sam., III, 1890, p. 167.

China.

PARREYSIA TRISULCATA Heude.

**Unio trisulcatus* HEUDE, Conch. Fluv. Nank., VIII, 1883, pl. LVII, fig. 108.

China.

(Group of *Parreysia leopoldvillensis*.)

Shell rounded rhomboid, somewhat inflated, subsolid, with a rounded post ridge; beaks full, the sculpture strongly and regularly zigzag-radial and extending well over the body of the shell; pseudocardinals heavy, subcompressed, crenate; anterior scars deep.

[1] Credited to Benson manuscript.

[2] The name modestus has been used by authors for a Brazilian *Unio*, but I can not find that it was ever described. Later Kuster used the name for a Chilean species; hence Heude changed his first name to *simpularis*. It is quite probable that this species should be placed in a separate group.

PARREYSIA LEOPOLDVILLENSIS Putzeys.

Unio leopoldvillensis PUTZEYS, Proc. Verb. Soc. Mal. Belg., XXVII, 1898, p. XXVII, figs 12, 13.[1]

(Group of *Parreysia bakeri.*)

Shell small, inflated, oval, rounded in front, bluntly pointed behind, inflated at or behind the central base; beaks full, high, sculptured with very strong, zigzag bars which extend part way over the disk and end rather suddenly, below which the shell is smooth; posterior ridge well developed, rounded; two compressed pseudocardinals and one lateral in the right valve, two pseudocardinals and two laterals in the left valve.[2]

PARREYSIA BAKERI H. Adams.

* *Unio bakeri* H. ADAMS, Pr. Zool. Soc. Lond., 1866, p. 376.—* PÆTEL, Conch. Sam., III, 1890, p. 145.—* SMITH, Ann. and Mag., X, 1892, p. 126, pl. XII, fig. 11.—* VON MARTENS, Besch. Deuts. Ost-Af., 1897, p. 231, pl. VII, fig. 6.

Lake Albert Nyanza, Central Africa.

PARREYSIA STUHLMANNI von Martens.

* *Unio stuhlmanni* VON MARTENS, Besch. Deuts. Ost-Af., 1897, p. 231, pl. VII, fig. 13.

Albert Edward Lake, Central Africa.

NODULARIA HAUTTECOEURI Bourguignat.

* *Unio hauttecoeuri* BOURGUIGNAT, Moll. Ny. Ouk., 1883, p. 5, figs. 1-3.—* VON MARTENS, Besch. Deuts. Ost-Af., 1897, p. 232, pl. I, fig. 23; VII, fig. 3.

NODULARIA HAUTTECOEURI var. EDWARDSIANA Bourguignat.

* *Unio edwardsianus* BOURGUIGNAT, Moll. Ny. Ouk., 1883, p. 12, figs. 7, 9.

Lake Victoria Nyanza, Central Africa.

PARREYSIA DUPONTI Rochebrune.

* *Reneus duponti* ROCHEBRUNE, Bull. Soc. Zool. Fr., XI., 1881, p. 481.
* *Unio duponti* ROCHEBRUNE, Bull. Soc. Philom., VI, 1882, p. 34.—* BOURGUIGNAT, Moll. Ny. Ouk., 1883, p. 8, figs. 10-12.—* PÆTEL, Conch. Sam., III, 1890, p. 151.
* *Unio bakeri* VON MARTENS, Sitzber. Ges. Nat. Fr., 1879, p. 104.
* *Unio grandidieri* BOURGUIGNAT, Moll. Ny. Ouk., 1883, p. 7, figs. 4-6.—* PÆTEL, Conch. Sam., III, 1890, p. 154.—* VON MARTENS, Besch. Deuts. Ost-Af., 1874, p. 233.

Lake Victoria Nyanza.

PARREYSIA RUELLANI Bourguignat.

* *Unio ruellani* BOURGUIGNAT, Moll. Ny. Ouk. 1883, p. 10, figs. 16-18.—* PÆTEL, Conch. Sam., III, 1890, p. 166.—* VON MARTENS, Besch. Deuts. Ost-Af., 1897, p. 235.

Lake Victoria Nyanza.

[1] I have not seen this species, and I place it here with some doubt.
[2] I adopt this group with practically the same limits as given by von Martens in the Beschalte. Unfortunately I have never seen any species belonging to it.

PARREYSIA MULTICOLOR von Martens.

* *Unio multicolor* VON MARTENS, Besch. Deuts. Ost-Af., 1897, p. 236, pl. VII, fig. 4.

Lake Victoria Nyanza.

PARREYSIA NGESIANUS von Martens.

* *Unio ngesianus* VON MARTENS, Besch. Deuts. Ost-Af., 1897, p. 234, pl. VII, fig. 7.

Lake Albert Edward Nyanza.

The following unfigured species are placed in this group by von Martens:

Unio billotianus CHARMES, Bull. Soc. Mal. Fr., II, 1885, p. 170, Bagamoyo, Central Africa.

Unio euphymus CHARMES, Bull. Soc. Mal. Fr., II, 1885, p. 171, Bagamoyo.

Unio dumesleanus CHARMES, Bull. Soc. Mal. Fr., II, 1885, p. 168, Bagamoyo.

(Group of *Parreysia fabagina.*)

Shell very small and solid, inflated, compressed on the sides, rhomboid, with a high, sharp posterior ridge and high beaks, having zigzag-radial sculpture sometimes extended over the disk, the posterior slope furnished with upcurved plications; pseudocardinals heavy, torn, one in the right valve, two in the left; muscular impressions circular, the anterior very deep.

PARREYSIA FABAGINA Deshayes.

* *Unio fabagina* DESHAYES, Nouv. Arch. de Mus., X, 1874, p. 128, pl. VII, figs. 4-6.—* P.ETEL, Conch. Sam., III, 1890, p. 152.—* FISCHER, Bull. Soc. d'Hist. Nat. Autun., 1891, p. 140.

Mekong River, Cambodia.

PARREYSIA BROTI Deshayes.

* *Unio broti* DESHAYES, Nouv. Arch. de Mus., X, 1874, p. 129, pl. VII, figs. 1-3.—* CROSSE and FISCHER, Jl. de Conch., XXVI, p. 323.—* P.ETEL, Conch. Sam., III, 1890, p. 146.

Mekong River, Cambodia.

(Group of *Parreysia nyassaensis.*)

Shell small, solid, inflated, triangular to rhomboid, the base straight or even a little arcuate, but sometimes having a slight fullness behind the central part; a high, well-defined posterior ridge ends at the post base and is sometimes slightly double; posterior slope abrupt; beaks high, with zigzag-radial sculpture, the bars approaching and often coalescing behind the center of the disk, the whole shell frequently corrugate sculptured; epidermis greenish, often slightly rayed; teeth solid, much like those of typical Parreysia; nacre white or bluish, sometimes microscopically, granularly radiate outside the palleal line; beak cavities not deep; anterior scars distinct.

Animal unknown.

†PARREYSIA NYASSAENSIS Lea.

* *Unio nyassaensis* LEA, Pr. Ac. N. Sci. Phila., VIII, 1864, p. 108; *Jl. Ac. N. Sci. Phila., VI, 1866, p. 33, pl. XII, fig. 32; *Obs., XI, 1867, p. 37, pl. XII, fig. 32.—*SMITH, Pr. Zool. Soc. Lond., 1881, p. 298, pl. XXXIV, fig. 34.—*PÆTEL, Conch. Sam., III, 1890, p. 161.—*ANCEY, Bull. Soc. Zool. Fr., VII, 1894, p. 225.—*VON MARTENS, Besch. Deuts. Ost-Af., 1897, p. 230.

* *Margaron* (*Unio*) *nyassaensis* LEA, Syn., 1870, p. 30.

* *Unio nyassæ* SOWERBY, Conch. Icon., XVI, 1868, pl. XLI, figs. 224, 224*a*, 224*b*.

* *Unio nyassanus* BOURGUIGNAT, Bull. Soc. Mal. Fr., VI, 1889, p. 38.

* *Unio hermosus* BOURGUIGNAT, Bull. Soc. Mal. Fr., VI, 1889, p. 38.—*ANCEY, Bull. Soc. Zool. Fr., VII, 1894, p. 226.[1]

Lake Nyassa, Central Africa.

†PARREYSIA KIRKII Lea.

* *Unio kirkii* LEA, Pr. Ac. N. Sci. Phila., VIII, 1864, p. 108; *Jl. Ac. N. Sci. Phila., VI, 1866, p. 32, pl. XII, fig. 30; *Obs., XI, 1867, p. 36, pl. XII, fig. 30.—*BOURGUIGNAT, Bull. Soc. Mal. Fr., VI, 1889, p. 38.—*ANCEY, Bull. Soc. Zool. Fr. VII, 1894, p. 225.—*VON MARTENS, Besch. Deuts. Ost-Af., 1897, p. 229.

* *Margaron* (*Unio*) *kirkii* LEA, Syn., 1870, p. 30.

Lake Nyassa.

PARREYSIA UJIJIENSIS Bourguignat.

* *Unio nyassaensis* var., SMITH, Pr. Zool. Soc. Lond., 1881, p. 298, pl. XXXIV, fig. 34.[2]

* *Grandidieria ujijiensis* BOURGUIGNAT, Bull. Soc. Mal. Fr., II, 1885, p. 7.

Lake Tanganyika.

†PARREYSIA AFERULA Lea.

* *Unio aferula* LEA, Pr. Ac. N. Sci. Phila., VIII, 1864, p. 109.

* *Unio aferulus* LEA, Jl. Ac. N. Sci. Phila., VI, 1866, p. 34, pl. XIII, fig. 34; *Obs., XI, 1867, p. 38, pl. XIII, fig. 34.—*BOURGUIGNAT, Bull. Soc. Mal. Fr., VI, 1889, p. 38.—*ANCEY, Bull. Soc. Zool. Fr., VII, 1894, p. 226.

* *Margaron* (*Unio*) *aferulus* LEA, Syn., 1870, p. 30.

Lake Nyassa.

PARREYSIA MONCETI Bourguignat.

* *Unio monceti* BOURGUIGNAT, Moll. Ny. Ouk., 1883, p. 15, figs. 13–15.—*VON MARTENS, Besch. Deuts. Ost-Af., 1897, p. 228.

Lake Victoria, Nyanza.

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[1] E. A. Smith, in Pr. Zool. Soc. Lond., 1877, p. 719; 1893, p. 640, believes that *Unio kirki* Lea and *aferulus* Lea are but varieties of *Unio nyassaensis*, and that *Unio hermosus* Bourguignat is identical with it. It is possible that the three forms of Lea may blend together, but the types are so distinct that I do not feel justified in uniting them even as varieties one of another.

[2] There is some confusion about this shell. The form on pl. XXXIV, which Smith probably refers to in the text as fig. 34*b* is simply fig. 34 on the plate, and is, I think, a distinct species, which has received the name of *ujijiensis* from Bourguignat. There is no fig. 34*b* on the plate. His 34*a*, which Smith calls var. *tanganyicensis*, is *U. nyassaensis* Lea. Bourguignat probably alluded to the fig. 34 when he bestowed his name, although he speaks of the var. *tanganyicensis* Smith. These must not be confounded with the original *Unio tanganyicensis* of Smith, which is a very different thing.

PARREYSIA HYPSIPRIMNUS von Martens.

* *Unio hypsiprimnus* VON MARTENS, Besch. Deuts. Ost-Af., 1897, p. 230, pl. VII, fig. 1.[1]

Lake Nyassa.

(Group of *Parreysia molleuri.*)

Shell subquadrate, solid, inflated, rounded in front, truncated behind, with high beaks, the sculpture of which was not observed, and a strong, sharp, curved posterior ridge; surface concentrically grooved; pseudocardinals thick, short, cut up with vertical grooves; laterals curved; nacre white.

PARREYSIA MOLLEURI Morlet.

* *Unio molleuri* MORLET, Jl. de Conch., XXXIX, 1891, p. 242, pl. VII, fig. 4.

Valley of the Mekong River.

Subgenus **AURORA** Simpson, 1900.

(Type, *Unio aurorcus* Heude.)

Shell small, ovate, subinflated, pointed behind, rather solid, with high, small beaks and strong, corrugated sculpture, which extends over half the disk in somewhat lachrymous, zigzag ridges and nodules, the outer part of the disk apparently having one or more strong, concentric ridges, the posterior slope being radiately ridged and nodulous; epidermis fulvous, beautifully and delicately green radiated; pseudocardinals conical, truncate, striate; laterals lamellar; nacre orange.[2]

PARREYSIA AURUREA Heude.

* *Unio aurorcus* HEUDE, Conch. Fluv. Nank., VIII, 1883, pl. LVII, fig. 106.—* PÆTEL, Conch. Sam., III, 1890, p. 145.

China.

Subgenus **PSEUDOBAPHIA** Simpson, 1900.

(Type, *Unio biexianus* Heude.)

Shell large, oval, inflated, gaping in front and behind, rather solid, with full beaks, the beak sculpture not seen, posterior part distinctly biangular; ligament large; epidermis smooth, brownish, somewhat rayed, right valve with a large, irregular pseudocardinal in front of the beak, with a pit in front of it; behind it on the hinge are numerous denticles, and at some distance behind two very faint laterals; left valve with two large pseudocardinals, one behind the other, and two remote

[1] I am not positive as to the systematic position of this and the last two species. The figure of the latter is from a very badly eroded shell, and it is difficult to tell what its affinities are.

[2] Heude's brief Latin description so poorly describes the peculiar species placed here that I can not be sure where it belongs, and that it should not have generic rank. I place it here provisionally.

blurred laterals; two upper anterior muscle scars united, very deep; posterior scars united, the lower long and oblique; beak cavities very large, deep; nacre flesh colored, dull.[1]

Animal unknown.

†PARREYSIA BIESIANA Heude.

* *Unio biesianus* HEUDE, Conch. Fluv. Nank., II, 1877, pl. XIV, fig. 30.—* PÆTEL, Conch. Sam., III, 1890, p. 146.

China.

Subgenus ACUTICOSTA Simpson, 1900.

(Type, *Unio chinensis* Lea.)

Shell pointed behind, produced at the center of the base, inflated, solid, with a sharp, pinched-up, but vanishing posterior ridge, beaks full, the sculpture strong, zigzag radial; epidermis smooth, rayed; pseudocardinals somewhat compressed, vertically ridged, ragged; laterals well developed, strongly obliquely ridged and granular.

†PARREYSIA CHINENSIS Lea.

* *Unio chinensis* LEA, Pr. Ac. Nat. Sci. Phila., XII, 1868, p. 150; * Jl. Ac. Nat. Sci. Phila., VI, 1868, p. 325, pl. LIII, fig. 138; *Obs., XII, 1869, p. 85, pl. LIII, fig. 138.—* PÆTEL, Conch. Sam., III, 1890, p. 148.

* *Margaron* (*Unio*) *chinensis* LEA, Syn., 1870, p. 30.

PARREYSIA CHINENSIS var. SQUAMMOSUS Heude.

* *Unio sinensis* var. *squammosus* HEUDE, Conch. Fluv. Nank., VIII, 1883, pl. LVIII, fig. 113.

PARREYSIA CHINENSIS var. LÆVIS Heude.

* *Unio squammosus* var. *lævis* HEUDE, Conch. Fluv. Nank., VIII, 1883, pl. LIX, fig. 116.

China.

PARREYSIA RETIARIA Heude.

* *Unio retiarius* HEUDE, Conch. Fluv. Nank., VIII, 1883, pl. LVII, fig. 107.—* PÆTEL, Conch. Sam., III, 1890, p. 165.

China.

Genus PTYCHORHYNCHUS Simpson, 1900.

(Type, *Unio pfisteri* Heude.)

Shell elongate, elliptical, round in front, pointed behind, the point being midway of the height of the shell, solid, slightly inflated, with a faint posterior ridge; beaks rather low, sculpture not seen; the posterior slope sculptured with strong, upcurved ridges, which sometimes extend slightly on to the disk, which is otherwise smooth and shining; left valve with two rather stumpy, roughened pseudocardinals and 1 or 2

[1] Heude says the beaks are corrugated.

somewhat blurred granulous laterals; right valve with a single blunt pseudocardinal, the hinge line in front of it being excavated, and a curious blurred lateral which is sometimes slightly split up; beak cavities shallow; dorsal scars few; nacre whitish. Animal unknown.

(Group of *Ptychobranchus pfisteri.*)

Characters as in the genus.

†PTCHORHYNCHUS PFISTERI Heude.

* *Unio pfisteri* HEUDE, Jl. de Conch., XXII, 1874, p. 112; * Conch. Fluv. Nank., I, 1875, pl. 1, fig. 1.—* P.ETEL, Conch. Sam., III, 1890, p. 163.

PTYCHORHYNCHUS PFISTERI var. INSPIRATUS Heude.

* *Unio pfisteri* var. *inspiratus* HEUDE, Conch. Fluv. Nank., II, 1877, pl. XIV, fig. 28.—* P.ETEL, Conch. Sam., III, 1890, p. 155.

Nankin River, China.

†PTYCHORHYNCHUS MEDIASTINUS Heude.[1]

* *Unio mediastinus* HEUDE, Conch. Fluv. Nank., VIII, 1883, pl. LXIII, fig. 123.—* P.ETEL, Conch. Sam., III, 1890, p. 158.

China.

(Group of *Ptychorhynchus apicellatus.*)

Shell subrhomboid, more or less biangulate behind.

PTYCHORHYNCHUS APICELLATUS Heude.

* *Unio apicellatus* HEUDE, Conch. Fluv. Nank., VIII, 1883, pl. LXIII, fig. 126.

China.

PTYCHORHYNCHUS SCHOMBURGIANUS Heude.

* *Unio schomburgianus* HEUDE, Jl. de Conch., XL, p. 314; * Conch. Fluv. Nank., IX, 1885, pl. LXXII, fig. 139.—* P.ETEL, Conch. Sam., III, 1890, p. 167.

Isle of Hainan, China.

PTYCHORHYNCHUS INCERTUS Simpson.

* *Unio compressus* HEUDE,[2] Conch. Fluv. Nank., III, 1877, pl. XXIV, fig. 52.—* P.ETEL, Conch. Sam., III, 1890, p. 148.
* *Unio murinus* HEUDE, Conch. Fluv. Nank., VIII, 1883, pl. LXII, fig. 121.
* *Unio morinus* P.ETEL, Conch. Sam., III, 1890, p. 160.

China.

Genus VIRGUS, Simpson, 1900.

(Type, *Unio beccarianus* Tapperone Canefri.)

Shell rather solid, elongated, inequilateral, compressed, rounded in front, nearly straight below, the dorsal line as far back as the hinder

[1] Probably only a variety of *P. pfisteri.*

[2] The name *compressus* has been twice used previously for a *Unio.* I change it here to *incertus.*

end of the ligament parallel with the base, behind the ligament the shell is obliquely truncate, the truncation somewhat upcurved, the shell ending in a rounded point at the posterior base; posterior ridge elevated, rounded, with sculpture radiating from it above and below; beaks rather low, radially ridged; pseudocardinals small, generally two in each valve; laterals rather short, club-shaped, one in the right and two in the left valve. Animal unknown.

(Group of *Virgus beccarianus.*)

Shell having the posterior ridge high and rounded, outlined on each side by a sulcus, the radiations from this ridge rather fine; surface concentrically sculptured.

VIRGUS BECCARIANUS Tapperone Canefri.

* *Unio beccarianus* TAPPERONE CANEFRI, Ann. Mus. Genov., XIX, 1883, p. 291, pl. XI, fig. 2.—* P.ETEL. Conch. Sam., III, 1890, p. 145.

Fly River, New Guinea.

(Group of *Virgus mattiroli.*)

Posterior ridge full, rounded, not outlined by sulci, covered with very strong corrugated ridges which curve outward each way from the center, the remainder of the shell smooth.

VIRGUS MATTIROLI Tapperone Canefri.

* *Unio mattiroli* TAPPERONE CANEFRI, Ann. Mus. Genov., XIX, 1883, p. 292, pl. XI, fig. 1.—* P.ETEL, Conch. Sam., III, 1890, p. 158.

Fly River, New Guinea.

(Group of *Virgus misoolensis.*)

Posterior ridge merely rounded, with radiating folds scattered over the shell, pseudocardinals two in the left valve and one in the right.

VIRGUS MISOOLENSIS Schepman.

* *Unio misoolensis* SCHEPMAN, Notes from Leyd. Mus., XVIII, 1896, p. 259, fig.—* DROUET, Jl. de Conch., XLV, 1897, p. 125.

Misool, Borneo.

Genus CTENODESMA Simpson, 1900.

(Type, *Unio borneensis* Issel.)

Shell subtrapezoid to long elliptical, rather thin, compressed, with a scarcely developed posterior ridge and low beaks whose sculpture is densely zigzag radial, becoming finely corrugated or nodulous on the disk and extending over most of the shell; the disk concentrically striate or sulcate at its outer edge; pseudocardinals one to two in each valve, very diverse in form, but showing a tendency to break up into

denticles; one lateral and sometimes a faint secondary one in the left valve and two in the right; dorsal scars few, diversified in form, and variously disposed in the shallow beak cavities; anterior muscle scars united; nacre whitish.

Animal unknown.

†CTENODESMA BORNEENSIS Issel.

**Unio plicatulus* LEA,[1] Pr. Ac. Nat. Sci. Phila., III, 1859, p. 152; Jl. Ac. Nat. Sci. Phila., IV, 1860, p. 247, pl. XXXVII, fig. 126; *Obs., VII, 1860, p. 65, pl. XXXVII, fig. 126.—* REEVE, Conch. Icon., XVI, 1865, pl. XXII, fig. 102.—* P.ETEL, Conch. Sam., III, 1890, p. 163.

**Margaron* (*Unio*) *plicatulus* LEA, Syn., 1870, p. 31.

**Unio borneensis* ISSEL, Moll. Borneo, 1874, p. 113.

**Unio penisatus* FISCHER and CROSSE,[2] Miss. Sci., Pt. 7, II, 1894, p. 599.

Borneo.

†CTENODESMA GUPPYI Smith.

**Unio guppyi* SMITH, Pr. Zool. Soc. Lond., 1885, p. 608, pl. XXXVII, figs. 88*a*, 88*b*.—* P.ETEL, Conch. Sam., III, 1890, p. 154.

Shortland Island; Solomon Islands.

Genus RECTIDENS Simpson, 1900.

(Type, *Unio prolongatus* Drouet.)

Shell elongated, with an angle at the anterior dorsal part, pointed and slightly biangulate behind, moderately solid, with two or three posterior ridges, the lower the higher; beaks full, sculpture not observed but probably zigzag radial; the posterior slope, and often part of the disk, covered with faint, granular radiating sculpture; epidermis smooth, olive; one compressed, short, recurved pseudocardinal in the left valve under the beak, with a very long one in front of it, and two laterals; two compressed pseudocardinals in the right valve, and a single lateral; all the teeth straight or nearly so; anterior muscle scars separate; beak cavities rather shallow; only one or two dorsal scars in each valve; nacre white or reddish.

Animal unknown.

†RECTIDENS SUMATRENSIS Dunker.

**Unio sumatrensis* DUNKER, Zeits. für Mal., IX, 1852, p. 52.—* PFEIFFER, Nov. Conch., II, 1866, p. 152, pl. XXXIX, figs. 10–12.—* VON MARTENS, Mal. Bl., XIV, 1866, p. 15.—* P.ETEL, Conch. Sam., III, 1890, p. 169.

Lake Dana I ıar, Sumatra.

[1] Lea's name was preoccupied by Kuster, or Charpentier, for a Mexican species in 1856. The name proposed by Issel in 1874 will have to be used.

[2] Proposed by Fischer and Crosse, because Lea's name *plicatulus* was preoccupied by Kuster.

† RECTIDENS LINGULATUS Drouet and Chaper.

* *Unio lingulatus* DROUET and CHAPER, Mém. Soc. Zool. Fr., V, 1892, p. 148, pl. v, figs. 7–9.—* DROUET, Jl. de Conch, XLI, 1893, p. 42.

Borneo.

† RECTIDENS PROLONGATUS Drouet.

* *Unio prolongatus* DROUET, Rev. Biol. Nord Fr., VI, 1894, p. 216; * Jl. de Conch., XLIII, 1895, p. 36.—* KOBELT, Abh. Senck. Nat. Ges., XXIV, 1897, p. 87, pl. XI, figs. 1, 2.

Borneo.

RECTIDENS PERAKENSIS de Morgan.

* *Unio perakensis* DE MORGAN, Bull. Soc. Zool. Fr., X, 1885, p. 424, pl. IX, figs. 3, 4.—* PÆTEL, Conch. Sam., III, 1890, p. 163.

Perak.

RECTIDENS PAHANGENSIS Smith.

* *Unio pahangensis* E. A. SMITH, Pr. Mal. Soc. Lond., III, 1899, p. 315, fig.

Pahang River, Malay Peninsula. Exceedingly near to *O. lingulatus* Drouet and Chaper.

Genus LAMELLIDENS Simpson, 1900.

(Type, *Unio marginalis* Lamarck.)

Shell elongate, elliptical, pointed behind, with a slight post-dorsal wing, a low, often biangulate posterior ridge, and generally two sharp, radiating liræ above it; beaks with curved, radiating ridges which sometimes are slightly zigzag and often become almost concentric, but which fade out as they approach each other at the center of the disk; epidermis smooth, generally shining, brownish, often with concentric bands of lighter color, rayless or nearly so; left valve with two compressed pseudocardinals, the front one roughened, and two laterals; right valve with two parallel, lamellar pseudocardinals and one lateral; cavity of the beaks rather shallow; dorsal scars few, deep, distinct, scattered; anterior scars separate; nacre bluish white to straw.

Animal unknown.

Subgenus LAMELLEDENS Simpson, 1900.

(Type, *Unio marginalis* Lamarck.)

Shell dark colored; teeth well developed.

† LAMELLIDENS MARGINALIS Lamarck.

* *Die breite Mahler-Muschel aus Grönland*, SCHRÖTER, Flussc., 1779, p. 181, pl. IX, fig. 1.

* ? *Unio groenlandicus* MÖRCH, Am. Jl. Conch., IV, 1868, p. 38.[1]

* ? *Unio testudinarius* SPENGLER, Skriv. Selsk. Nat., III, 1793, p. 65.—* PÆTEL, Conch. Sam., III, 1890, p. 169.

[1] The name *groenlandicus* can not stand for this species, since Schröter did not use his appellation in anything but a descriptive sense. The species is found only in India, no *Naiad* being known from Greenland.

* ? *Unio truncatus* SPENGLER, Skriv. Selsk. Nat., III, 1793, p. 65.—? SCHRÖTER, Arch. Zool. Zoot. 1802, II, 2 Stück, p. 107.

* *Unio marginalis* LAMARCK, An. sans Vert., VI, 1819, p. 79.[1]—* DESHAYES, Enc. Méth. II, 1827, p. 151, pl. CCXLVII, fig. 1.—* HANLEY, Test. Moll., 1842, p. 206; * Biv. Shells, 1843, p. 206, pl. XX, fig. 53.—* CATLOW and REEVE, Conch. Nom., 1845, p. 61.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—* KUSTER, Conch, Cab. Unio, 1861, p. 239, pl. LXXX, fig. 4.—* SOWERBY, Conch. Icon., XVI, 1867, pl. LIX, fig. 297.—* HANLEY and THEOBALD, Conch. Ind., 1876, p. 20, pl. XLIII, fig. 2.—* PÆTEL, Conch. Sam., III, 1890, p. 158.

* *Margarita* (*Unio*) *marginalis* LEA, Syn., 1836, p. 37; 1838, p. 24.

* *Margaron* (*Unio*) *marginalis* LEA, Syn., 1852, p. 38; 1870, p. 60.

* *Unio anodontina* LAMARCK, An. sans Vert., VI, 1819, p. 80.—* DESHAYES, An. sans Vert., VI, 1835, p. 546; II, 1839, p. 671.

* *Unio anodontinus* KUSTER, Conch. Cab. Unio, 1861, p. 240, pl. LXXX, fig. 15.—* PÆTEL, Conch. Sam., III, 1890, p. 144.

* † *Symphynota bilineata* LEA, Tr. Am. Phil. Soc., IV, 1831, p. 98, pl. XI, fig. 19; * Obs., I, 1834, p. 108, pl. XI, fig. 19.

* *Margarita* (*Unio*) *bilineatus* LEA, Syn., 1836, p. 38; 1838, p. 25.

* *Unio bilineatus* HANLEY, Test. Moll., 1842, p. 207; * Biv. Shells, 1843, p. 207, pl. XXI, fig. 30.—* CATLOW and REEVE, Conch. Nom., 1845, p. 56.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXI, fig. 365.

* *Margaron* (*Unio*) *bilineatus* LEA, Syn., 1852, p. 38; 1870, p. 61.

* ? *Unio evanescens* MOUSSON, Moll. Java, 1849, p. 91, pl. XVII, fig. 2.

† **LAMELLIDENS MARGINALIS** var. **OBESUS** Hanley and Theobald.

* *Unio marginalis* var. *obesa* HANLEY and THEOBALD, Conch. Ind., 1876, p. 20, pl. XLIII, fig. 3.

* ? *Unio corrianus* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXVII, fig. 401.

† **LAMELLIDENS MARGINALIS** var. **TRICOLOR** Kuster.

* *Unio tricolor* KUSTER, Conch. Cab. Unio, 1856, p. 156, pl. XLV, fig. 1.—* JICKELI, Faun. Moll. N. O. Af., 1874, p. 275.—* PÆTEL, Conch. Sam., III, 1890, p. 170.

* *Unio marginalis* var. *tricolor* HANLEY and THEOBALD, Conch. Ind., 1876, p. 20, pl. XLII, fig. 5.

LAMELLIDENS MARGINALIS var. **CANDAHARICUS** Hanley and Theobald.

* *Unio marginalis* var. *candaharica* HANLEY and THEOBALD, Conch. Ind., 1870, p. 20, pl. XLIII, fig. 4.

† **LAMELLIDENS MARGINALIS** var. **CYLINDRICUS** Hanley and Theobald.

* *Unio marginalis* var. *cylindrica* HANLEY and THEOBALD, Conch. Ind., 1876, p. 20, pl. XLIV, fig. 1.

LAMELLIDENS MARGINALIS var. **HANLEYI** Simpson.

* *Unio marginalis* var. *corriana* HANLEY and THEOBOLD, Conch. Ind., 1876, p. 20, pl. XLIV, fig. 4.[2]

India; Burma; Pegu; Ceylon; Canton River, China?. I believe that Mousson's *U. evanescens* is *L. marginalis*, but can it be from Java?

[1] I use Lamarck's name for this species because the *U. testudinarius* and *truncatus* were only briefly and imperfectly described, and never figured, their habitats being given as Greenland. Lamarck refers to the figures in Enc. Méth., pl. 247, figs. 1, 1*a*, 1*b*, 1*c*, which very accurately represent the shell we know as *Unio marginalis*.

[2] Not Lea's *corrianus* at all, but very different. I change the name to *hanleyi*.

† LAMELLIDENS PULCHER Tapperone-Canefri.

* *Unio pulcher* TAPPERONE-CANEFRI, Ann. Mus. Civ., VII, 1889, p. 350.[1]

Houngdaran, Burma.

LAMELLIDENS EXANTHEMATICUS Kuster.

* *Unio exanthematicus* KUSTER, Conch. Cab. Unio, 1861, p. 243, pl. LXXXI, fig. 2.—* PÆTEL, Conch. Sam., III, 1890, p. 152.

East Indies.

† LAMELLIDENS THWAITESII Lea.

Unio thwaitesii LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 152; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 246, pl. XXXVII, fig. 125; * Obs., VII, 1860, p. 64, pl. XXXVII, fig. 125.—* REEVE, Conch. Icon., XVI, 1865, pl. XXIII, fig. 105.—* HANLEY and THEOBALD, Conch. Ind., 1876, p. 20, pl. XLIII, fig. 1.—* PÆTEL, Conch. Sam., III, 1890, p. 169.

* *Margaron* (*Unio*) *thwaitesii* LEA, Syn., 1870, p. 41.

* *Unio consobrinus* HANLEY and THEOBALD, Conch. Ind., 1876, p. 19, pl. XLI, fig. 7.

Ceylon.

† LAMELLIDENS CONSOBRINUS Lea.

* *Unio consobrinus* LEA,[2] Pr. Ac. N. Sci. Phila., III, 1859, p. 331; * Jl. Ac. N. Sci. Phila., 1860, p. 272, pl. XLV, fig. 152; * Obs., VII, 1860, p. 90, pl. XLV, fig. 152.—* PÆTEL, Conch. Sam., III, 1890, p. 148.

* *Margaron* (*Unio*) *consobrinus* LEA, Syn., 1870, p. 46.

* *Unio corbeti* DESCHAMPS, Bull. Soc. Zool. Fr., XVII, 1892, p. 68, fig.[3]

China; India; Ceylon.

† LAMELLIDENS LAMELLATUS Lea.

* *Unio lamellatus* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 19, pl. VI, fig. 16; * Obs., II, 1838, p. 19, pl. VI, fig. 16.—* TROSCHEL, Arch. für. Nat., V, 1839, Pt. 2, p. 234.—* HANLEY, Test. Moll., 1842, p. 194; Biv. Shells, 1843, p. 194, pl. XXI, fig. 49.—* CATLOW and REEVE, Conch. Nom., 1845, p. 60.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* CHENU, Ill. Conch., 1858, pl. XXII, figs. 3, 3*a*, 3*b*.—* SOWERBY, Conch. Icon., XVI, 1866, pl. LII, fig. 272.—* HANLEY and THEOBALD, Conch. Ind., 1876, p. 21, pl. XLIV, fig. 7.—* PÆTEL, Conch. Sam., III, 1890, p. 126.

* *Margarita* (*Unio*) *lamellatus* LEA, Syn., 1836, p. 26; 1838, p. 20.

* *Margaron* (*Unio*) *lamellatus* LEA, Syn., 1852, p. 29; 1870, p. 46.

* † *Unio layardii* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 153; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 243, pl. XXXVI, fig. 122; * Obs., VII, 1860, p. 61, pl. XXXVI, fig. 122.—* REEVE, Conch. Icon., XVI, 1865, pl. XXIII, fig. 111.—* HANLEY and THEOBALD, Conch. Ind., 1876, p. 19, pl. XLI, fig. 1.—* PÆTEL, Conch. Sam., III, 1890, p. 157.

* *Margaron* (*Unio*) *layardii* LEA, Syn., 1870, p. 46.

India; Ceylon.

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[1] Only a Latin description is given. We have two shells in the U. S. National Museum from the type lot, and it is, perhaps, a valid species, close to *marginalis*.

[2] Possibly only a variety of *thwaitesii*.

[3] *Unio mainwaringi* Nevill. Shells have been several times received bearing this name, which seem to me to be only *consobrinus*. I can not find that Nevill ever described the species.

LAMELLIDENS SCUTUM Sowerby.

* *Unio scutum* SOWERBY, Conch. Icon., XVI, 1868, pl. XCIV, fig. 510.[1]—* HANLEY and THEOBALD, Conch. Ind., 1876, p. 22, pl. XLVI, fig. 1.—* P.ETEL, Conch. Sam., III, 1890, p. 167.

Tenasserim.

†LAMELLIDENS CORRIANUS Lea.

* *Unio corrianus* LEA, Tr. Am. Phil. Soc., VI, 1834, p. 65, pl. IX, fig. 25; * Obs., I, 1834, p. 177, pl. IX, fig. 25.—* HANLEY, Test. Moll., 1842, p. 207; * Biv. Shells, 1843, p. 207, pl. XX, fig. 60.—* CATLOW and REEVE, Conch. Nom., 1845, p. 57.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—* P.ETEL, Conch. Sam., III, 1890, p. 149.

* *Margarita* (*Unio*) *corrianus* LEA, Syn., 1836, p. 38; 1838, p. 25.

* *Margaron* (*Unio*) *corrianus* LEA, Syn., 1852, p. 38; 1870, p. 61.

India; Burma; Pegu.

†LAMELLIDENS GENEROSUS Gould.

* *Unio generosus* GOULD, Pr. Bost. S. N. Hist., II, 1847, p. 220; * Otia Conch., 1862, p. 210.—* HANLEY and THEOBALD, Conch. Ind., 1876, p. 22, pl. XLVI, fig. 4.—* P.ETEL, Conch. Sam., III, 1890, p. 153.

* *Margaron* (*Unio*) *generosus* LEA, Syn., 1870, p. 29.

* *?Unio lamellatus* SOWERBY, Conch. Icon., XVI, 1868, pl. XCIV, fig. 511.

Burma; Pegu.

†LAMELLIDENS CANEFRIANUS Simpson.

* *Unio protensus* TAPPERONE-CANEFRI,[2] Am. Mus. Civ. Gen., VII, 1889, p. 349.

Prome, Lower Burma.

†LAMELLIDENS JENKINSIANUS Benson.[3]

* *Unio jenkinsonianus* BENSON, Ann. and Mag., X, 1862, p. 185.—* HANLEY and THEOBALD, Conch. Ind., 1876, p. 19, pl. XLI, fig. 4.—* P.ETEL, Conch. Sam., III, 1890, p. 155.

Assam.

Subgenus SPATHOPSIS, Simpson. 1900.

(Type, *Anodonta guillaini* Recluz.)

Shell long, elliptical, compressed, beaks rather low, said to bear concentrically roughened ridges, with slight plications in front and behind them; posterior ridge not developed; surface shining, smooth; hinge line narrow, with faint, greatly elongated pseudocardinals and laterals;

[1] Credited by Sowerby to Benson.

[2] Preoccupied by Lea in 1865 for a North Carolina *Unio*, hence the name is changed as above.

[3] This is figured by Hanley and Theobald as a heavy shell, shaped much like an old *Unio buckleyi*, and quite different from the other species of the genus. But there is in the U. S. National Museum collection a specimen which is much thinner than the figured shell, and more nearly approaching *marginalis* in form.

escutcheon deep, triangular; beak cavities shallow; anterior muscle scars elongated; posterior faint; iridescent behind.[1]

Animal unknown.

LAMELLIDENS GUILLAINI Recluz.

Anodonta guillaini Recluz, Jl. de Conch., I, 1850, p. 55; Zeits. fur Mal., VII, 1851, p. 140.—Crosse, Jl. de Conch., XXXI, 1883, p. 222, pl. IX, fig. 4.—Pætel, Conch. Sam., III, 1890, p. 180.

Brava, northeast Africa, in the Somali country.

Genus TRAPEZOIDEUS Simpson.

(Type, *Unio foliacea* Gould.)

Shell trapezoid, much compressed, with a low posterior ridge, and but slightly raised though pointed beaks, which seem to be sculptured with irregularly radial ridges arranged in two imperfect chevron-shaped loops; surface concentrically sculptured, often having irregular radial ridges on the posterior slope; epidermis yellowish-green or brownish, with two or more green rays above the posterior ridge; teeth compressed; two pseudocardinals in the left valve, one under the beak, the other in front, often not well separated, and two laterals; right valve with two pseudocardinals and one lateral; pseudocardinals all irregular, often pitted and peculiarly dentellate; laterals granular, showing traces of vertical striation; cavity of the beaks rather deep, compressed; muscle scars shallow, anterior scars separate; nacre soft, creamy, yellowish in the beak cavities.

Animal unknown.

†TRAPEZOIDEUS FOLIACEUS Gould.

Unio foliacea Gould, Pr. Bost. Soc. N. Hist., I, 1843, p. 141; Otia Conch., 1862, p. 191.

Unio foliaceus Catlow and Reeve, Conch. Nom., 1845, p. 59.—H. and A. Adams, Gen. Rec. Moll., II, 1857, p. 492.—Hanley and Theobald, Conch. Ind., 1876, p. 19, pl. XLII, fig. 3.—Anderson, Yunnan Exp., 1877, p. 900, pl. LXXX, figs. 8–12.—Pætel, Conch. Sam., III, 1890, p. 153.

Margaron (Unio) foliaceus Lea, Syn., 1852, p. 39; 1870, p. 62.

†*Unio peguensis* Anthony, Am. Jl. Conch., I, 1865, p. 351, pl. XXV, fig. 2.—Sowerby, Conch. Icon., XVI, 1868, pl. XCV, fig. 519.—Pætel, Conch. Sam., III, 1890, p. 162.

Margaron (Unio) peguensis Lea, Syn., 1870, p. 51.

TRAPEZOIDEUS FOLIACEUS var. COMPTUS Deshayes and Jullien.

Unio comptus Deshayes and Jullien, Nouv. Arch. de Mus., X, 1874, p. 126, pl. VI, figs. 3, 4.

Unio fragilis Nevill, Jl. As. Soc. Beng., XLVI, 1877, p. 39.—Anderson, Yunnan Exp., 1877, p. 400, pl. LXXX, figs. 8–12.

Burma; Cambodia.

[1] I hardly know where to place this, as the description is lacking in several essential characters. It is probable that the beak sculpture is much like that of *Lamellidens* instead of being properly concentric, and it may be a subgenus of that group.

†TRAPEZOIDENS MISELLUS Morelet.

* *Unio misellus* MORELET, Jl. de Conch., XIII, 1865, p. 21; * Ser. Conch., IV, 1875, p. 341, pl. XIV, fig. 2.—* P.ETEL, Conch. Sam., III, 1890, p. 159.

* † *Unio siamensis* LEA, Pr. Ac. N. Sci. Phila., X, 1866, p. 133; * Jl. Ac. N. Sci. Phila., VI, 1868, p. 279, pl. XXXVIII, fig. 93; * Obs., XII, 1869, p. 39, pl. XXXVIII, fig. 93.

* *Margaron* (*Unio*) *siamensis* LEA, Syn., 1870, p. 57.

TRAPEZOIDEUS PALLEGOIXI Sowerby.

* *Anodon pallegoixi* SOWERBY,[1] Conch. Icon., XVII, 1867. pl. XVII, fig. 17.

* *Anodonta pallegoixi* CLESSIN, Conch. Cab. Ano., 1876, p. 210, pl. LXIV, fig. 6.—* P.ETEL, Conch. Sam., III, 1890, p. 183.

Siam; Cambodia.

TRAPEZOIDEUS PENINSULARIS Simpson.

* *Unio sumatrensis* SOWERBY,[2] Conch. Icon., XVI, 1865, pl. XXVIII, fig. 142.

Sumatra.

TRAPEZOIDEUS EXOLESCENS Gould.[3]

* *Unio exolescens* GOULD, Pr. Bost. S. N. Hist., I, 1843, p. 141.—* CATLOW and REEVE, Conch. Nom., 1845, p. 59.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* HANLEY and THEOBALD, Conch. Ind., 1876, p. 43, pl. CVII, fig. 5.—* P.ETEL, Conch. Sam., III, 1890, p. 152.

* *Margaron* (*Unio*) *exolescens* LEA, Syn., 1852, p. 32; 1870, p. 51.

Tavoy, Burma.

TRAPEZOIDEUS THECA Benson.

* *Unio theca* BENSON, Ann. and Mag., X, 1862, p. 186.—* HANLEY and THEOBALD, Conch. Ind., 1876, p. 6, pl. XII, fig. 5.—* P.ETEL, Conch. Sam., III, 1890, p. 169.

Cane River, Bundelkhund, India.

Genus ARCONAIA Conrad, 1865.

(Type, *Triquetra lanceolata* Lea.)

* *Arconaia* CONRAD, Am. Jl. Conch., I, 1865, p. 234.

Shell greatly elongated, inflated, solid, twisted on its axis, sometimes straight, but generally having the posterior end curved strongly to the right or left, with a decided posterior ridge on both sides of the shell, ending in a blunt point, with usually a small ridge above on the post slope; beaks rather low, sculpture not seen, but probably zigzag radial;

[1] Sowerby says nothing about teeth in his shell, which is from Siam. The teeth of Lea's specimen of *U. siamensis* are scarcely developed, and a comparison of his shell with Sowerby's figure convinces me that they are very nearly allied. Lea's figure shows the shell biangulate behind, which is an error.

[2] This is not Lea's *sumatrensis*, nor that of Dunker. I have therefore changed the name to *peninsularis*. I am not certain as to its relations. It is not *U. comptus* Deshayes and Jullien, as Fischer believes

[3] Gould did not figure this, and I have not seen the type. The shell figured as this by Hanley and Theobald in the Conchologia probably belongs here.

often a few nodulous or wavy ridges cross the body of the shell, which is irregularly sulcate; epidermis rayless; two pseudocardinals in the right valve, the upper compressed, separated from the split-up lower one by a parallel-sidedpit, two in the left, and two heavy laterals; one lateral in the right and a vestige of one below it; laterals granulated and vertically striate; muscle scars deep, anterior small, the front and upper united, the hinder separate, posterior muscle scars long, oblique; beak cavities very shallow; dorsal scars numerous, placed just on the inner edge of the hinge; nacre white. The lobes of the mantle are not united into siphons, but separated throughout, with only a feeble commissure separating the anal and branchial openings.

(Group of *Arconaia lanceolata*.)

Shell with an anterior wing.

†ARCONAIA LANCEOLATA Lea.

* *Triquetra lanceolata* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 79.
* *Hyria lanceolata* LEA, Pr. Ac. N. Sci. Phila., 1856, p. 300.
* *Arconaia lanceolata* CONRAD, Am. Jl. Conch., I, 1865, p. 234.
* *Triquetra contorta* LEA,[1] Pr. Ac. N. Sci. Phila., VIII, 1856, p. 300; *Obs., VI, 1857, p. 39, pl. XXXIII, fig. 33; *Jl. Ac. N. Sci. Phila., III, 1858, p. 319, pl. XXXIII, fig. 33.
* *Hyria contorta* SOWERBY, Conch. Icon., XVII, 1869, pl. 1, figs. 2 *a*, 2 *b*.—* PÆTEL, Conch. Sam., III, 1890, p. 189.
* *Margaron* (*Triquetra*) *contorta* LEA, Syn., 1870, p. 26.
* *Unio contortus* HEUDE, Conch. Fluv. Nank., II, 1877, pl. XV, fig. 31.

China.

†ARCONAIA MUTICA Heude

* *Unio contortus* var. *muticus* HEUDE, Conch. Fluv. Nank., II, 1877, pl. XV, fig. 32.

China.

(Group of *Arconaia conjungens*.)

Shell moderately solid, slightly twisted and bent, rounded in front; pseudocardinals not so much torn as in the *lanceolata* group; not winged in front.

ARCONAIA CONJUNGENS Heude.

* *Unio contortus* var. *conjungens* HEUDE, Conch. Fluv. Nank., II, 1877, pl. XV, fig. 33.

China.

Genus PSEUDAVICULA Simpson, 1900.

(Type, *Unio johnstoni* Smith.)

Shell rather solid, inflated, with a well-developed anterior and posterior dorsal wing; dorsal line strongly incurved; beaks full, not high; a

[1] The specific name was changed to *contorta* by Lea, because he thought his earlier name, *lanceolata*, was less appropriate.

high, down-curved posterior ridge runs to the posterior basal point, and between this point and the posterior point of the wing the outline is deeply incurved; base and lower part of anterior end rounded; surface slightly sculptured with concentric ridges; beak sculpture probably zigzag rayed; anterior tooth of left valve elongate, slightly corrugated, that of the right double; laterals in left valve double, single in the right, straight, elongated, thin, and prominent; nacre, rose tinted.

Animal unknown.

PSEUDAVICULA JOHNSTONI Smith.

Unio (metaptera) johnstoni SMITH, Pr. Zool. Soc. Lond., 1893, p. 640, pl. LIX, figs. 18–20.[1]

Lake Mweru, British Central Africa.

Genus ARCIDOPSIS Simpson, 1900.

(Type, *Unio footei* Theobald.)

Shell inequilateral, elongated, with dorsal and ventral lines nearly straight and parallel; anterior end strongly and obliquely truncated from the beaks to the anterior base, and ending in a rather sharp but rounded point below; posterior end obliquely truncated above, rounded below; posterior ridge full, rounded; the shell in front and below rather compressed; surface concentrically and radially ridged; pseudocardinals strong, two in the right valve, one in the left, and supported by a strong, cardinal rib; muscle scars well impressed; parallel line distinct. Animal unknown.[2]

ARCIDOPSIS FOOTEI Theobald.

Unio footei THEOBALD, Jl. As. Soc. Beng., XLV, 1876, p. 187, pl. XIV, figs. 9, 9*a*.

Kistna River, India.

The following are indeterminate Oriental Unionidæ:

Unio acrorrhynchus VON MARTENS, S. B. Nat Fr., 1894, p. 214. Korea.
Unio alfierianus BOURGUIGNAT, Voy. Choa, 1885, p. 43. Choa, Central Africa.
Unio antiniloticus BOURGUIGNAT, Bull. Soc. Zool. Fr., XI, 1880, p. 482, pl. XII, fig. 5. High Senegal.
Unio ascia HANLEY, Biv. Shells, 1856, p. 385.
Unio bridouxi BOURGUIGNAT, Un. & Ir. Tan., 1886, p. 13. Lake Tanganyika.
Unio cyamus PHILIPPI, Zeits für Mal., VIII, 1852, p. 125. S. Africa.
Unio diespiter MABILLE, Bull. Soc. Mal. Fr., IV, 1887, p. 162. Tonkin.
Unio dolichorhynchus TAPPERONE CANEFRI, Ann. Mus. Civ. Gen., 1889, p. 348. Mercato de Mandelay.

[1] A remarkable *Naiad*, closely imitating some of the South American Prisodons in general appearance, to which it may be nearly allied.

[2] Unfortunately Theobald's Latin description of *Unio footei* is not at all complete. No laterals are mentioned, and he says nothing of the color of the epidermis or of the nacre. The beaks were too much worn in his specimens to give any characters. The shell resembles some of the Arcas of the *Barbatia* group, and may not belong to the *Unionidæ* at all.

Unio forscali PARREYSS. Where described? Egypt.
Unio gianelli TAPPERONE CANEFRI, Ann. Mus. Civ. Gen., 1889, p. 353. Mercato de Mandelay.
Unio gibbus SPENGLER, Skriv. Selsk. Nat., III, 1793, p. 64. Tranquebar.
Unio gladiator ANCEY, Le Nat., III, 1881, p. 468. Tonkin.
Unio gottschei VON MARTENS, S. B. Nat. Fr., 1894, p. 215. Korea.
Unio grantianus BOURGUIGNAT, Moll. Ny. Ouk., 1883, p. 14. Lake Oukerewe, Central Africa.
Unio guillemeti BOURGUIGNAT, Un. & Ir. Tan., 1886, p. 15. Lake Tanganyika.
Unio hagnei STRUBELL, Nach. Mal. Ges., 1897, p. 10. Sumatra.
Unio hamyanus BOURGUIGNAT, Voy. Choa., 1885, p. 42. Central Ethiopia.
Unio idgi BOURGUIGNAT Moll. Terr. et Fluv. Choa, 1885, p. 39. Choa, Africa.
Unio ilqui SOLEILET, Voy. Choa, 1885, p. 40. Central Ethiopia.
Unio inæqualis ROCHEBRUNE, Bull. Soc. Philom., 1882, p. 44. Mekong.
Unio jaculus ROCHEBRUNE, Bull. Soc. Philom., 1882, p. 44. Mekong.
Unio josseti BOURGUIGNAT, Un. & Ir. Tan., 1886, p. 19. Lake Tanganyika.
Unio jouberti BOURGUIGNAT, Un. & Ir. Tan., 1886, p. 8. Lake Tanganyika.
Unio larigerinus BOURGUIGNAT, Un. & Ir. Tan., 1886, p. 14. Lake Tanganyika.
Unio ligula MOUSSON, L. & S. W. Moll. Java, 1849, p. 94. Java.
Unio longitudinatus ANTON, Verz der Conch. 1839, p. ?
Diplodon ludoricianum ROCHEBRUNE, Bull. Soc. Phil., 1882, p. 43. Mekong.
Unio madagascariensis SGANZIN, Mem. Soc. Hist. Strab., 1846, p. 8. Mahoupa River, Madagascar. No figure.
Unio menardi BOURGUIGNAT, Un. & Ir. Tan., 1886, p. 20. Lake Tanganyika.
Unio meneliki SOLILLET, Voy. Choa, 1885, p. 41. Central Ethiopia.
Unio moineti BOURGUIGNAT, Un. & Ir. Tan., 1886, p. 11. Lake Tanganyika.
Unio palembangensis STRUBELL, Nach. Mal. Ges., 1887, p. 10. Sumatra.
Dysnomia paronina ROCHEBRUNE, Bull. Soc. Phil., 1882, p. 43. Cochin China.
Unio pliculosus VON MARTENS, S. B. Nat. Fr., 1894, p. 216. Korea.
Unio schweinfurthi VON MARTENS, S. B. Nat. Fr., 1886, p. 127. Egypt.
Unio sitifensis MORELET, Jl. de Conch., 1853, p. 298.
Unio soleilleti BOURGUIGNAT, Voy. Choa, 1885, p. 39. Central Ethiopia.
Loncosilla solenoides RAFINESQUE, Cont. Mon., 1831, p. 7. Jellinghy River, Bengal.
Unio subamygdalinus DROUET, Jl. de Conch., 1895, p. 33. West Africa.
Unio truncatus SPENGLER, Skiv. Selsk. Nat., III, 1793, p. 66. Tranquabar.
Unio verrucifer VON MARTENS, S. B. Nat. Fr., 1894, p. 216. Korea.
Unio vinckei BOURGUIGNAT, Un. & Ir. Tan., 1886, p. 18. Lake Tanganyika.
Unio visseri BOURGUIGNAT, Un. & Ir. Tan., 1886, p. 21. Lake Tanganyika.
Zaira elegans ROCHEBRUNE, Bull. Soc. Mal. Fr., III, 1886, p. 12.
Zairia poirieri ROCHEBRUNE, Bull. Soc. Mal. Fr., III, 1886, p. 11.
Zaira araneosa ROCHEBRUNE, Bull. Soc. Mal. Fr., III, 1886, p. 11.
Zairia sordida ROCHEBRUNE, Bull. Soc. Mal. Fr., III, 1886, p. 13.
Zaira disciformis ROCHEBRUNE, Bull. Soc. Mal. Fr., III. 1886, p. 10.

The last five from the Kongo. I know nothing whatever of the genus *Zaira*. It may be merely a new name for the section *Cælatura* of the genus Nodularia. It was proposed by Rochebrune.[1]

LAMPHORHAMPHUS.

Male and female shells alike, dull-colored; beak sculpture nearly or quite radial marsupium occupying the entire inner branchiæ, forming a pad-like mass.

[1] Bull. Soc. Mal. Fr., 1886, p. 1.

Genus TETRAPLODON Spix, 1827.

Castalia LAMARCK, An. sans Vert., VI, 1819, p. 66.
Tetraplodon SPIX, Test. Fluv. Bras., 1827, p. 32.
Prisodon LEA, Synopsis, 1852, p. 18.

Shell triangular, solid, inflated, with a high, sharp, posterior ridge, behind which it is decidedly truncated; beaks very full and high, sculpture strictly radial, or with one or two pairs of the central bars coalescing below, the whole extending more or less over the disk as strong ridges; epidermis thick, dark, dull colored; hinge line arched; there is a very strong, compressed pseudocardinal in the left valve, and there are two in the right, all in front of the beaks; behind them are several denticles; one lateral in the right valve and two in the left; all the teeth strongly vertically ridged; beak cavities deep, not compressed; anterior muscle scars small, deep; nacre whitish.

Animal having the labial palpi wider than long; margins of mantle inferiorly open, but united posteriorly to form two siphons, branchial and anal; branchial opening surrounded with papillæ; anal opening smooth; outer branchiæ united to the mantle to their posterior ends; inner united to the abdominal sac; foot tongue-shaped, thick, produced anteriorly. (Troschel.)

(Type, *Tetraplodon pectinatum* Spix.)[1]

(Group of *Tetraptodon ambiguus* characters, as in the genus.)

†TETRAPLODON AMBIGUUS (Lamarck) Sowerby.[2]

*? *Prisodon truncatus* SCHUMACKER, Ess. Nouv. Syst., 1817, p. 139.

*? *Castalia ambigua* LAMARCK, An. sans Vert., VI, 1819, p. 67; GUERIN, Icon. Regne. An., 1829, pl. XXVIII.—* WYATT, Man. Conch., 1838, p. 65, pl. XI, fig. 5.—* CHENU, Man., 1859, II, p. 149, fig. 735.—* SOWERBY, Conch. Icon., XVII, 1869, pl. I, fig. 1.

* *Unio ambigua* DESHAYES, Tr. Elem. Conch., 1839, p. 18, pl. XXIX, figs. 7–9.

* *Unio ambiguus* SOWERBY, Rec. and Fos. Shells, XVI, 1823, fig. *d*.—* REEVE, Conch. Syst., 1841, p. 117, pl. LXXVII, fig. 2.—* CATLOW and REEVE, Conch. Nom., 1845, p 55.—* DESHAYES, Tr. Elem., II, 1853, p. 219, pl. XXIX, figs. 7–9.—* KUSTER, Conch. Cab. Unio, 1856, p. 165, pl. XLVIII, fig. 1.

* *Tetraplodon pectinatum* SPIX, Test. Fluv. Bras., 1827, p. 32, pl. XXV, figs. 3–4.

*† *Castalia inflata* D'ORBIGNY, Guer. Mag., 1835, p. 43.—* HANLEY, Test. Moll., 1842, p. 173; * Biv. Shells, 1843, p. 173, pl. XXIV, fig. 12.—*D'ORBIGNY, Voy. Am. Mer., 1843, p. 598, pl. LXXII, figs. 4–10.

*† *Castalia turgida* HUPE, Moll. Nouv., III, 1857, p. 76, pl. XIV, fig. 1.—* SOWERBY, Conch. Icon., XVII, 1869, pl. III, fig. 11.

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[1] The name *Castalia* applied by Lamarck to this genus in 1819 can not stand, as it was used in Vermes in 1817. I have every reason to suppose that the young in this and all the South American genera of *Unionidæ* are carried in the inner gills.

[2] Schumacher gave only a brief description of his *Prisodon truncatus*, and referred to no figure, and the same can be said of Lamarck regarding his *Castalia ambigua*, both of which are supposed by authors to be the above species. But either of these descriptions apply equally well to several species, therefore they can not be considered authentic.

*† *Castalia hanleyana* SOWERBY, Conch. Icon., XVII, 1869, pl. I, fig. 5.—* P.ETEL, Conch. Sam., III, 1890, p. 189.

* *Castalia carolinensis* SOWERBY, Conch. Icon., XVII, 1869, pl. II, fig. 6.—* P.ETEL, Conch. Sam., III, 1890, p. 189.

* *Castalia cordata* STROBEL, Mat. Mal., Pt. I, 1874, p. 75.

Amazon and Rio de la Plata River systems.

† TETRAPLODON QUADRILATERUM d'Orbigny.

* *Castalia quadrilatera* D'ORBIGNY, Guer. Mag., No. 62, 1835, p. 42.—* HANLEY, Test. Moll., 1842, p. 173; * Biv. Shells, 1843, p. 173.—* D'ORBIGNY, Voy. Am. Mer., 1843, p. 599, pl. LXXIII.—* TROSCHEL, Arch. für Nat., XIII, 1847, Pt. 1, p. 222.—* VON IHERING, Arch. für Nat., 1893, p. 89.

* *Mya ambigua* WOOD, Ind. Test. Rev., 1856, p. 200, pl. I (supp.), fig. 9.

* *Castalia acuticosta* HUPE, Moll. Nouv., III, 1857, p. 77, pl. XIV, fig. 3.—* SOWERBY, Conch. Icon., XVII, 1869, pl. III, figs. 12, 12*a*, 12*b*.—* P.ETEL, Conch. Sam., III, 1890, p. 189.

* *Castalia cordata* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 509, pl. CXX; III, figs. 2, 2*a*.—* SOWERBY, Conch. Icon., XVII, 1869, pl. II, fig. 8.—* P.ETEL, Conch. Sam., III, 1890, p. 189.

* *Castalia latiquadrata* SOWERBY, Conch. Icon., XVII, 1869, pl. II, fig. 10.—* P.ETEL, Conch. Sam., III, 1890, p. 189.

Tropical South America east of the Andes. Perhaps a form of *ambiguus*.

† TETRAPLODON OVATUS Sowerby.

* *Castalia ovata* SOWERBY, Conch. Icon., XVII, 1869, pl. I, fig. 4.—* P.ETEL, Conch Sam., III, 1890, p. 189.

Brazil.

† TETRAPLODON RETUSUS Hupe.

* *Castalia ambigua* SOWERBY, Conch. Man., 1839, fig. 140.

* *Castalia retusa* HUPE, Moll. Nouv., III, 1857, p. 75, pl. XIV, fig. 2.—* SOWERBY, Conch. Icon., XVII, 1869, pl. I, fig. 2.—* P.ETEL, Conch. Sam., III, 1890, p. 189.

Guiana.

TETRAPLODON QUADRATUS Sowerby.

* *Castalia quadrata* SOWERBY, Conch. Icon., XVII, 1867, pl. II, figs. 7, 7*a*, 7*b*.—* P.ETEL., Conch. Sam., III, 1890, p. 189.

TETRAPLODON SCHOMBERGIANUS Sowerby.

* *Castalia schombergiana* SOWERBY, Conch. Icon., XVII, 1869, pl. XIV, fig. 3.—* P.ETEL., Conch. Sam., III, 1890, p. 189.

Guiana.

(Group of *Tetraplodon multisulcatus*.)

Shell small, somewhat compressed, with a moderate posterior ridge, and covered throughout with delicate ridges; teeth more Unionoid than in the typical Tetraplodons.

Animal unknown.

TETRAPLODON MULTISULCATUS Hupe.

* *Castalia ambigua* BLAINVILLE, Man., 1825, p. 539, pl. LXVII, fig. 4.
* *Castalia multisulcata* HUPE, Moll. Nouv., III, 1857, p. 75, pl. XIV, fig. 4.—* SOWERBY, Conch. Icon., XVII, 1869, pl. II, figs. 9, 9*a*, 9*b*.—* PÆTEL, Conch. Sam., III, 1890, p. 189.

Brazil.

TETRAPLODON ECARINATUS Mousson.

* *Castalia ecarinata* MOUSSON, Mal. Bl., XVI, 1869, p. 185.—* PFEIFFER, Nov. Conch., IV, 1876, p. 140, pl. CXXXI, figs. 9, 10.—* PÆTEL, Conch. Sam., III, 1890, p. 189.

Puerto Nuevo, Magdalena River, Colombia.

TETRAPLODON CROSSEANUS Hidalgo.

* *Castalia crosseana* HIDALGO, Jl. de Conch., XIII, 1865, pp. 316, 429, pl. XIV, fig. 2.—* PÆTEL, Conch. Sam., III, 1890, p. 189.

Imbabura, Ecuador.

Genus CASTALINA Von Ihering, 1891.

Castalina VON IHERING, Zool. Anzeiger, 1891, p. 478.

Shell somewhat triangular, inflated, but having the sides a little flattened, solid, with a strong posterior ridge, the subtruncate posterior slope rising almost to a wing above; beaks full, high, with nearly strictly radial sculpture; surface slightly, irregularly, concentrically sulcate, sometimes a little corrugated; posterior slope generally plicate or corrugated; epidermis thick, rayless, blackish; hinge plate arched, wide; two to several radial pseudocardinals in each valve; two vertically or obliquely striate laterals in the left valve and one in the right; beak cavities deep; anterior muscle scars deep, united; nacre whitish.

Animal, probably very much like that of *Tetraplodon*, but with the mantle closed or open at the branchial and anal openings.

(Type, *Castalina martensi* von Ihering.)

(Group of *Castalina martensi*.)

Characters as in the genus.

†CASTALINA MARTENSI von Ihering.

* *Castalina martensi* VON IHERING, Zool. Anz., XIV, 1891, p. 477; Arch. für Nat., 1893, p. 81, pl. III, fig. 5.

Southern Brazil.

†CASTALINA NEHRINGI von Ihering.

Castalina nehringi VON IHERING, Zool. Anz., XIV, 1891, p. 477; * Arch. für Nat., 1893, p. 75, pl. III, fig. 4.

Southern Brazil.

†CASTALINA PSAMMOICA d'Orbigny.

Unio psammoica D'ORBIGNY, Guer. Mag., 1835, p. 35; * Voy. Am. Mer., 1843, p. 608, pl. LXXI, figs. 4–7.—* KUSTER, Conch. Cab. Unio, 1861, p. 263, pl. LXXXVIII, fig. 4.

Castalina psammoica VON IHERING, Arch. für Nat., 1893, p. 79.

Margaron (Unio) psammoicus LEA, Syn., 1852, p. 19; 1870, p. 30.

Unio psammoicus H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 498.—* SOWERBY, Conch. Icon., XVI, 1868, pl. XCIII, fig. 507.—* PÆTEL, Conch. Sam., III, 1890, p. 164.

Tributaries of the Rio de la Plata.

†CASTALINA UNDOSA von Martens.

Castalia undosa VON MARTENS, S. B. Nat. Fr., 1885, p. 148; * Conch. Mitth., III, 1885, p. 19, pl. XLII, figs. 2, 3.—PÆTEL, Conch. Sam., III, 1890, p. 190.—VON IHERING, Arch. für Nat., 1893, p. 84.—* NEHRING, Jl. de Conch., 1894, p. 82.

Southern Brazil.

(Group of *Castalina orbignyi.*)

Shell irregularly rhomboid, somewhat compressed, equilateral, anterior end rounded, posterior truncate, having a wide, shallow, radiating furrow above the rounded posterior ridge which causes a sinuosity in the outline; epidermis brownish yellow, hinge crenate; one pseudocardinal in the left valve and two in the right, which are jagged or somewhat broken up; laterals elongate and striate.

CASTALINA ORBIGNYI Hupe and Deville.[1]

Unio orbignyi HUPE and DEVILLE, Rev. et Mag., 1850, p. 645, pl. XVI, fig. 1.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.

Margaron (Unio) orbignyi LEA, Syn., 1852, p. 24; 1870, p. 37.

Unio orbignyana HUPE, Moll. Nouv., III, 1857, p. 83, pl. XVII, fig. 1.

Unio d'orbignyanus SOWERBY, Conch. Icon., XVI, 1868, pl. XCVI, fig. 523.

Unio orbignyanus PÆTEL, Conch. Sam., III, 1890, p. 162.

Upper Amazon.

Genus CASTALIELLA Simpson, 1900.

(Type, *Castalia sulcata* Krauss.)

Shell subtriangular, greatly inflated, subsolid and strongly sulcate; beaks high, the sculpture regularly radiate; posterior ridge well defined and sharp; epidermis reddish chestnut; hinge line narrow, arched; there are two vertically striate pseudocardinals in the right valve, separated by a parallel-sided socket, the lower the larger and split, and three in the left standing side by side, the middle one the largest, the lower two torn, with a few small tubercles in each valve behind them; one granular

[1] I do not know just where to place this species, never having seen it, and the descriptions not being full in essential details. It is probably a *Castalina*. No mention is made of sculpture, but from the figure it seems to be slightly sulcate.

lateral in the right valve and two in the left, which show traces of vertical striation; beak cavities deep, not compressed; nacre purple.[1]

Animal unknown.

†CASTALIELLA SULCATA Krauss.

**Castalia sulcata* KRAUSS, Zeits. für Mal., 1849, p. 99.—* PÆTEL, Conch. Sam., III, 1890, p. 190.

**Unio kraussii* LEA, Pr. Ac. N. Sci. Phila., VI, 1853, p. 376.[2]

**Margaron* (*Unio*) *kraussii* LEA, Syn., 1870, p. 35.

Surinam.

Genus CALLONAIA Simpson, 1900.

(Type, *Castalia duprei* Recluz.)

Shell triangular, thin, inflated, with very high, full beaks which appear to be without sculpture;[3] a very high, sharp posterior ridge extends to the base of the shell, above which it is decidedly truncated; anterior end somewhat pointed above, rounded below; ligament very short; surface nearly smooth but somewhat sulcate anteriorly; epidermis bright greenish yellow, shining; hinge line strongly arched; teeth compressed, high; two pseudocardinals in each valve, all interlocking and side by side; one lateral in the right valve and two in the left, a little ragged and granularly vertically striate; beak cavities very deep, not compressed; muscle scars superficial; nacre brilliant, bluish white, radiately striate posteriorly. Animal unknown.

†CALLONAIA DUPREI Recluz.

**Castalia duprei* RECLUZ, Rev. Zool., 1843, p. 305, pl. XXXV; * Mag. Zool., 1843, p. 1.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 509.—* CHENU, Man., 1859, II, p. 149, fig. 738.—* PÆTEL, Conch. Sam., III, 1890, p. 189.

**Unio duprei* CATLOW and REEVE, Conch. Nom., 1845, p. 58.

**Margaron* (*Prisodon*) *duprei* LEA, Syn., 1852, p. 18; 1870, p. 27.

**Castalia dolabella* SOWERBY, Conch. Icon., XVII, 1869, pl. III, figs. 13 *a*, 13 *b*, 13 *c*.—* PÆTEL, Conch. Sam., III, 1890, p. 189.

Great lakes of Para, Brazil.

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[1] This species, of which the type is in the Lea collection, has some of the characters of *Prisodon* and *Castalina*, but I can not satisfactorily refer it to either, and it is certainly not a *Diplodon*. Its strong sulcation, reddish chestnut epidermis, and purple nacre are characters that are not possessed by any South American *Naiades* that I am acquainted with.

[2] Lea received this shell from Dr. Dunker under the name of *Castalia sulcata* Krauss. Believing it to be a *Unio*, he placed it in that genus, and the name *sulcatus* being preoccupied in *Unio*, he changed it as above.

[3] In one of Lea's shells the beaks are almost perfect, and not a sign of sculpture can be seen.

Genus HYRIA Lamarck, 1819.

(Type, *Hyria corrugata* Lamarck.)

Hyria LAMARCK, An. sans Vert., VI, 1819, p. 81.[1]
Triplodon SPIX, Test. Fluv. Bras., 1827, p. 35.
Naïa SWAINSON, Tr. on Mal., 1840, p. 379.

Shell subrhomboidal, solid, slightly inflated, narrower and dorsally winged in front, and having a post-dorsal wing; posterior ridge often double, causing the shell to be biangulate behind; beaks low, with strong, nearly radial sculpture, the central bars coalescing below, the whole continuing as strong, radial, and zigzag ridges over more or less of the disk; epidermis thick, greenish when young, brownish or blackish when old; there are two or more rather short, compressed pseudocardinals in each valve, which are much split up into denticles; one lateral in the right and two in the left valve; teeth often somewhat vertically striated; dorsal scars numerous; nacre whitish.

Animal with mantle lobes united together behind and furnished with two short, contractile siphons. (J. E. Gray.)

Subgenus HYRIA Lamarck, 1819.

(Type, *Hyria corrugata* Lamarck.)

Characters as in the genus.

†HYRIA CORRUGATA Lamarck.

* *Hyria corrugata* LAMARCK, An. sans Vert., VI, 1819, p. 82.—* SOWERBY, Rec. and Foss. Shells, 1823, No. XVI, fig. *d*; * Conch. Man., 1839, fig. 144.—* REEVE, Conch. Syst., I, 1841, p. 120, pl. XC, fig. 2.—* HANLEY, Test. Moll., 1842, p. 215; * Biv. Shells, 1843, p. 215.—* CATLOW and REEVE, Conch. Nom., 1845, p. 65.—* KUSTER, Conch. Cab. Unio, 1856, p. 140, pl. XLI, fig. 1.—* CHENU, Man., 1859, II, p. 149, fig. 733.—* REEVE, Elem. Conch., II, 1860, pl. XXXI, fig. 179.—* SOWERBY, Conch. Icon., XVII, 1869, pl. I, fig. 1.—* PÆTEL, Conch. Sam., III, 1890, p. 189.

* ? *Unio corrugata* BLAINVILLE, Man., 1825, p. 539, pl. LXVII, fig. 1.

[1] In 1753 Klein (Testamen Méthodi, p. 135, pl. 9, fig. 36) used the name *Triquetra* for the shell which has since been known as *Hyria syrmatophora* Gronovius. In 1817 Schumacher founded the genus *Prisodon* (Essai Nouv. Système, p. 138), in which under section *a* he placed his *P. obliquus*, a smooth species considerably drawn out, and in section *b* he put *P. truncatus*, which is possibly the same as the *Castalia ambigua* of Lamarck. These certainly belong to two genera. Dr. Lea in the Synopsis used Klein's name for the winged shell (*Hyria corrugata* Lamarck), and used the name *Prisodon* for Schumacher's section *b* (*P. truncatus Schumacher*). Lea erred in this, because Klein was not a binomial author, and his name can not be used. In the proceedings of the U. S. National Museum, XVIII, 1896, p. 315, I restored the name of *Prisodon* Schumacher to the first section, pointing out that the *P. obliquus* Schumacher must stand as its type. Two years after Schumacher's name appeared Lamarck published the generic name *Hyria* in the Animaux sans Vertèbres, VI, 1819, p. 81, and placed in it first his *H. avicularis*, which equals Schumacher's *P. obliquus*, and secondly *H. corrugata*. I now believe that these corrugated forms are generically distinct from the smooth ones, and as Schumacher's *Paxyodon* is almost certainly founded on one of the smooth species, Lamarck's name *Hyria* can be used by elimination for the *corrugatus* and allied forms.

* *Margaron* (*Triquetra*) *corrugata* LEA, Syn., 1852, p. 17; 1870, p. 25.
* *Triquetra corrugata* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 508.
* ? *Triplodon rugosum* SPIX, Test. Fluv. Bras., 1827, p. 35, pl. XXIX, figs. 1,2.
* *Hyria rugosa* DESHAYES, Enc. Méth., II, 1827, p. 151, pl. CCXLVII, fig. 2.
* *Mya angulata* WOOD, Ind. Test. Sup., 1828, p. 3, pl. I, fig. 12.
* *Margarita* (*Unio*) *angulatus* LEA, Syn., 1836, p. 10; 1838, p. 13.
* *Hyria exasperata* SOWERBY, Conch. Icon., XVII, 1869, pl. II, fig. 3.—*PÆTEL, Conch. Sam., III, 1890, p. 189.

Eastern Peru to Guiana; south throughout Brazil.

†HYRIA RUGOSISSIMA Sowerby.

* *Hyria rugosissima* SOWERBY, Conch. Icon., XVII, 1869, pl. III, fig. 5.—* PÆTEL, Conch. Sam., III, 1890, p. 189.

Amazon River.

HYRIA LATIALATA Sowerby.

* *Hyria latialata* SOWERBY, Conch. Icon., XVII, 1869, pl. II, fig. 4.—*PÆTEL, Conch. Sam., III, 1890, p. 189.

Guiana.

†HYRIA TRANSVERSA Hupe.

* *Hyria transversa* HUPE, Moll. Nouv., III, 1857, p. 79, pl. XV, fig. 1.—* SOWERBY, Conch. Icon., XVII, 1869, pl. IV, fig. 7.—* PÆTEL, Conch. Sam., III, 1890, p. 189.

Brazil.

Subgenus TRIQUETRANA Simpson, 1900.

(Type, *Unio stevensi* Lea.[1])

Shell compressed, with a feebly developed posterior wing, thickened in front; each valve with about three somewhat divergent pseudocardinals which are sometimes nearly smooth and at others break into denticles; one granular lateral in the right valve and two in the left which are sometimes obliquely and faintly vertically striate; external sculpture much as in *Hyria*. Animal unknown.

†HYRIA STEVENSI Lea.

* *Unio stevensi* LEA, Pr. Ac. N. Sci. Phila., I, 1871, p. 188; * Jl. Ac. N. Sci. Phila., VIII, 1874, p. 22, pl. VII, fig. 19; * Obs., XIII, 1874, p. 26, pl. VII, fig. 19.

Yuruari River, Guiana.

Genus PRISODON Schumacher, 1817.

(Type, *Mya syrmatophora* Meuschen in Gronovius.)

Triquetra KLEIN, Tent. Methodi, Ost, 1753, p. 135.
Prisodon SCHUMACHER (part), Essai Nouv. Syst., 1817, p. 138.
Paxyodon SCHUMACHER, Essai Nouv. Syst., 1817, p. 139.

Shell aviculiform, solid, somewhat inflated, with a well-developed posterior ridge, the area above it being excavated, its outline from the

[1] This shell bears much the same relation to *Hyria* that *Castalina* does to *Tetraplodon*, its teeth being more unionoid than those of *Hyria* and the shell more compressed.

hinder basal point to the end of the post dorsal wing generally incurved; posterior slope having a radial row of plications, as in *Cristaria*; surface slightly concentrically sculptured and having delicate radiating *liræ* throughout, so that the surface is microscopically reticulated; beaks full, but not elevated, without sculpture as far as noticed; epidermis yellowish green or brownish, shining, often bronzy; hinge narrow under the beaks, widening in front and behind; left valve with two or more elongated compressed pseudocardinals which show a tendency to break into denticles, and two laterals; right valve with two or more similar pseudocardinals and a single lateral; laterals vertically, granularly striate.

Animal with the labial palpi triangular, the hinder parts free as in *Unio*, not united posteriorly; branchiæ large, equal in size. (Troschel.)

Subgenus **PRISODON** Schumacher, 1817.

(Type, *Mya syrmatophora* Meuschen.)

Characters as in the genus.

†PRISODON SYRMATOPHORUS Meuschen in Gronovius.

* *Triquetra subviridis* KLEIN, Tent. Méth. Ost., 1753, p. 135, pl. IX, fig. 36.[1]—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 505; III, pl. CXX, figs. 1, 1*a*.—* PÆTEL, Conch. Sam., III, 1890, p. 189.

* *Margaron* (*Triquetra*) *subviridis* LEA, Syn., 1852, p. 17; 1870, p. 25.

* *Mya syrmatophora* MEUSCHEN in Gronovius, Zooph., 1781, pl. XVIII, figs. 1, 2.[2]—* GMELIN, Syst. Nat., 1788, No. 3222.—* WOOD, Gen. Conch., I, 1815, p. 110.—* DILLWYN, Cat., I, 1817, p. 54.—* WOOD, Ind. Test., 1825, p. 12, pl. II, fig. 36*b*.

* *Hyria syrmatophora* SOWERBY, Rec. and Foss. Shells, XVI, 1823, fig. *d*; * Conch. Man., 1839, fig. 143.—* REEVE, Conch. Syst., I, 1841, p. 120, pl. XC, fig. 1.—* HANLEY, Test. Moll., 1842, p. 214; * Biv. Shells, 1843, p. 214.—* CATLOW and REEVE, Conch. Man., 1845, p. 65.—* TROSCHEL, Arch. für Nat., XIII, Pt. I, 1847, p. 271.—* WOOD, Ind. Test. rev., 1856, p. 17, pl. II, fig. 36.—* HUPE, Moll. Nouv., III, 1857, p. 79, pl. XV, fig. 2.—* SOWERBY, Conch. Icon., XVII, 1869, pl. V, fig. 2.—* PÆTEL, Conch. Sam., III, 1890, p. 189.

* *Unio syrmatophora* DESHAYES, Tr. Elem., II, 1853, p. 219, pl. XXIX, figs. 10, 11.

* *Margarita* (*Unio*) *syrmatophorus* LEA, Syn., 1836, p. 11; 1838, p. 13.

* ? *Paryodon ponderosus* SCHUMACHER, Ess. Nouv. Syst., 1817, p. 140, pl. XI, fig. 3.

* *Hyria avicularis* var. *b*. LAMARCK, An. sans Vert., VI, 1819, p. 82.

Guiana; Brazil.

†PRISODON COMPLANATUS Hupe.

* *Hyria complanata* HUPE, Moll. Nouv., III, 1857, p. 80, pl. XV, fig. 3.—* SOWERBY, Conch. Icon., XVII, 1869, pl. IV, fig. 9.—* PÆTEL, Conch. Sam., III, 1890, p. 189.

* *Hyria syrmatophora* KUSTER, Conch. Cab. Unio, 1856, p. 141, pl. XLI, fig. 4.

Guiana.

[1] Klein's species evidently equals the *syrmatophora* of Gronovius, but his name can not be used, as he was not a binomial author.

[2] Gronovius used only generic names in the Zoophylaceum, and died while the work was in progress. Meuschen finished it and figured the above species and described it in the explanation of the plate.

† PRISODON ALATUS Sowerby.[1]

* *Hyria alata* SOWERBY, Conch. Icon., XVII, 1869, pl. v, fig. 13.—PÆTEL, Conch. Sam., III, 1890, p. 189.

Guiana.

PRISODON CASTELNAUDI Hupe.

* *Hyria castelnaudi* HUPE, Moll. Nouv., III, 1857, p. 81, pl. XVI, fig. 1.—* SOWERBY, Conch. Icon., XVII, 1869, pl. IV, fig. 8.—* PÆTEL, Conch. Sam., III, 1890, p. 189.[2]

Brazil.

† PRISODON OBLIQUUS Schumacher.

* *Prisodon obliquus* SCHUMACHER, Ess. Nouv. Syst., 1817, p. 139, pl. XL, fig. 2.[3]
* *Hyria obliqua* PÆTEL, Conch. Sam., III, 1890, p. 189.
* *Hyria avicularis* LAMARCK, An. sans Vert., VI, 1819, p. 82.—* CROUCH, Ill. Int. Lam., 1827, p. 16, pl. IX, figs. 5 *a*, *b*.—* STARK, Nat. Hist., II, 1828, p. 89.—* WYATT, Man. Conch., 1838, p. 67, pl. V, fig. 4.—* DELESSERT, Rec. Coq. Lam., 1841, pl. XII, fig. 9.—* HANLEY, Test. Moll., 1842, p. 214; * Biv. Shells, 1843, p. 214, pl. XXIV, fig. 11.—* CATLOW and REEVE, Conch. Nom., 1845, p. 65.—* TROSCHEL, Arch. für Nat., XIII, Pt. 1, 1847, p. 271, pl. VI, fig. 3.—* CHENU, Man., 1859, II, p. 149, fig. 734.—* SOWERBY, Conch. Icon., XVII, 1869, pl. III, figs. 6 *a*, *b*.
* *Unio avicularis* DESHAYES, Enc. Méth., II, 1830, p. 583; * Traite Elem. Conch., 1839, p. 18, pl. XXIX, figs. 10, 11.
* *Hyria aricularia* GUERIN, Icon. Regne An., 1844, II, pl. XXVIII, fig. 8.
* *Unio caudatus* WAGNER, Test. Fluv. Bras., 1827, p. 35, pl. XXVII, figs. 1, 2.
* *Diplodon furcatum* SPIX, Test. Fluv. Bras., 1827, p. 35, pl. XXVII, figs. 1, 2.
* *Hyria elongata* SWAINSON, Ex. Conch., 1841, p. 29, pl. XXIV.
* *Triquetra elongata* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 508.

Amazon drainage; southward through Brazil.

PRISODON RECTUS Sowerby.[4]

* *Hyria recta* SOWERBY, Conch. Icon., XVII, 1868, pl. V, fig. 10.—* PÆTEL, Conch. Sam., III, 1890, p. 189.

South America; locality unknown.

† PRISODON BROWNIANUS Lea.

* *Unio brownianus* LEA, Tr. Am. Phil. Soc., 1838, p. 108, pl. XXIV, fig. 116; * Obs., II, 1838, p. 108, pl. XXIV, fig. 116.—* TROSCHEL, Arch. für Nat., V, 1839, Pt. 2, p. 237.
* *Margarita* (*Unio*) *brownianus* LEA, Syn., 1838, p. 13.
* *Hyria browniana* HANLEY, Test. Moll., 1842, p. 215; * Biv. Shells, 1843, p. 215.—* CATLOW and REEVE, Conch. Nom., 1845, p. 65.—* SOWERBY, Conch. Icon., XVII, 1869, pl. V, fig. 12.—* PÆTEL, Conch. Sam., III, 1890, p. 189.

[1] This form has the posterior wing greatly produced and curved upward. I doubt whether it is more than a form of *syrmatophora*.

[2] This is probably a variety of *obliquus* Schumacher.

[3] Only a part of the interior is figured, but from its form I think there need be no doubt as to what the author meant.

[4] This may be only a peculiar *obliquus*. The dorsal line curves up in the center.

* *Margaron* (*Triquetra*) *browniana* LEA, Syn., 1852, p. 17; 1870, p. 26.
* *Triquetra browniana* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 508.

Amazon River.

Subgenus **HYRIANA** Simpson, 1900.

(Type, *Unio ortonii* Lea.)

Shell solid, compressed, elliptical, with a slight posterior dorsal wing and a strong one anteriorly, and a well-defined but low posterior ridge ending in a point well above the base, inflated at post-basal region, distinctly sulcate; beaks low, apparently not rayed; epidermis shining, light yellowish brown; hinge line evenly curved; pseudocardinals numerous, much split into denticles and crooked; two laterals in the left valve and one (no doubt) in the right; beak cavities very shallow; dorsal scars numerous, anterior scars deep; nacre whitish, radially grooved along the palleal line.[1]

† PRISODON ORTONII Lea.

* *Unio ortonii* LEA, Pr. Ac. N. Sci. Phila., XII, 1868, p. 161; *Jl. Ac. N. Sci. Phila., VI, 1868, p. 321, pl. LII, fig. 134; *Obs., XII, 1869, p. 81, pl. LII, fig. 134.—*PÆTEL, Conch. Sam., III, 1890, p. 162.
* *Margaron* (*Unio*) *ortonii* LEA, Syn., 1870, p. 28.

River Napo, Ecuador.

Genus DIPLODON Spix, 1827.

(Type, *Diplodon ellipticum* Spix.)

Diplodon SPIX, Test. Fluv. Bras., 1827, p. 33, pl. XXVI.

Shell elliptical, rounded, elongated or trapezoidal, with rather low beaks which are more or less distinctly radially sculptured, the ridges usually curved and approaching below, with a low or scarcely developed posterior ridge; surface slightly concentrically sculptured, sometimes broken into fine nodules or corrugations; epidermis dull, rayless; hinge with two compressed pseudocardinals in the right valve, and one slender lateral, and two compressed pseudocardinals in the left valve, one in front of the other, and two laterals; nacre bluish to white, dull, often blotched; beak cavities shallow; dorsal scars numerous, forming a row in the beak cavity parallel with the hinge line.

Animal with the marsupium occupying nearly the whole length of the inner branchiæ, a few ovules sometimes being found in the outer gills;[2]

[1] I have seen only a single left valve, the type. The anterior wing of this is gone, and the epidermis is somewhat eroded. The shell has been injured when young, which has probably caused a long, low, radial furrow that runs in front of the posterior ridge. The space occupied by the pseudocardinals is not so long proportionally as in typical *Prisodon*.

[2] I found a few ovules in the outer gills of *D. acutirostris* Lea, of South America, while the inner gills were full, and Mr. Henry Suter states that the ovules of *D. menziezi* Gray, of New Zealand, occupy the inner gills for the most part.

branchiæ rather large, angular at base, inner much the larger, united their whole length to the abdominal sac; palpi scarcely projecting posteriorly; mantle very thin, thickened on the edges; branchial opening papillose, separated from the smooth anal opening by a strong bridge; superanal opening not closed below.

Subgenus DIPLODON Spix, 1827.

Beak sculpture consisting of unbroken ridges, covering the whole beaks.

Animal having the labial palpi rounded below and at posterior base, scarcely projecting behind.

(Type, *Diplodon ellipticum* Spix.)

(Group of *Diplodon delodontus.*)

Shell elliptical to subtrapezoidal, inflated, subsolid, with a low posterior ridge, sometimes having a slight posterior dorsal wing; one or two central pairs of bars of the beak sculpture usually joining below; pseudocardinals sometimes slightly dentellate.

Animal having the characters of the genus.

† DIPLODON DELODONTUS Lamarck.

**Unio delodonta* LAMARCK, An. sans. Vert., VI, 1819, p. 77.—* DELESSERT, Rec. Coq. Lam., 1841, pl. XII, fig. 7.—* D'ORBIGNY, Voy. Am. Mer., 1843, p. 605.—* CATLOW and REEVE, Conch. Nom., 1845, p. 58.—* CHENU, Ill. Conch., 1858, pl. XII, figs. 1. 1*a*.

**Margarita* (*Unio*) *delodontus* LEA, Syn., 1836, p. 26; 1838, p. 20.

**Unio delodontus* HANLEY, Test. Moll., 1842, p. 194; * Biv. Shells, 1843, p. 194, pl. XXI, fig. 56.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* KUSTER, Conch. Cab. Unio, 1861, p. 234, pl. LXXVIII, fig. 5.—* PÆTEL, Conch. Sam., III, 1890, p. 150.

**Margaron* (*Unio*) *delodontus* LEA, Syn., 1852, p. 29; 1870, p. 46.

* *Unio delodon* STROBEL, Mat. Mal., Pt. 1, 1874, p. 71.

*† *Unio lacteolus* LEA, Tr. Am. Phil. Soc., V, 1834, p. 40, pl. VIII, fig. 19; * Obs., I, 1834, p. 152, pl. VIII, fig. 19.—* D'ORBIGNY, Mag. Zool., 1835, p. 34.

Argentina; Paraguay; Uruguay; southern Brazil.

† DIPLODON RHOMBEUS Wagner.

**Unio rhombeus* WAGNER, Test. Fluv. Bras., 1827, p. 34, pl. XXVIII, figs. 1, 2.—* HANLEY, Test. Moll, 1842, p. 208; * Biv. Shells, 1843, p. 208, pl. XXII, fig. 20.—* CATLOW and REEVE, Conch. Nom., 1845, p. 63.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—* PÆTEL, Conch. Sam., III, 1890, p. 165.

**Margarita* (*Unio*) *rhombeus* LEA, Syn., 1836, p. 39; 1838, p. 25.

* *Margaron* (*Unio*) *rhombeus* LEA, Syn., 1852, p. 38; 1870, p. 61.

Brazil.

† DIPLODON PAULISTA von Ihering.

* *Unio paulista* VON IHERING, Arch. für Nat., 1893, p. 93, pl. IV, fig. 7.—* NEHRING, Jl. de Conch., 1894, p. 82.

São Paulo, Brazil.

†DIPLODON AMPULLACEUS Lea.

* *Unio ampullaceus* LEA, Pr. Ac. N. Sci. Phila., X, 1866, p. 34; * Jl. Ac. N. Sci. Phila., VI, 1868, p. 269, pl. XXXV, fig. 83; * Obs., XII, 1869, p. 29, pl. XXXV, fig. 83.
* *Margaron* (*Unio*) *ampullaceus* LEA, Syn., 1870, p. 53.

South America.

†DIPLODON APPRIMUS Lea.

* *Unio apprimus* LEA, Pr. Ac. N. Sci. Phila., X, 1866, p. 34; * Jl. Ac. N. Sci. Phila., VI, 1868, p. 263, pl. XXXIII, fig. 78; Obs., XII, 1869, p. 23, pl. XXXIII, fig. 78.
* *Margaron* (*Unio*) *apprimus* LEA, Syn., 1870, p. 46.

South America.

†DIPLODON WYMANII Lea.[1]

* *Unio wymanii* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 90; * Jl. Ac. N. Sci. Phila., VI, 1863, p. 381, pl. XLII, fig. 289; * Obs., X, 1863, p. 17, pl. XLII, fig. 289.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXIV, fig. 449.—* VON MARTENS, Mal. Bl., XV, 1868, p. 193.—* PÆTEL, Conch. Sam., III, 1890, p. 172.
* *Margaron* (*Unio*) *wymanii*, LEA, Syn., 1870, p. 35.

Uruguay River, South America.

DIPLODON EXPANSUS Kuster.[2]

* *Unio expansus* KUSTER, Conch. Cab. Unio, 1856, p. 149, pl. XLIII, fig. 5.—* PÆTEL, Conch. Sam., III, 1890, p. 152.

Brazil?.

†DIPLODON PECULIARIS Lea.

* *Unio peculiaris* LEA, Pr. Ac. N. Sci. Phila., X, 1866, p. 33; * Jl. Acad. N. Sci. Phila., VI, 1868, p. 265, pl. XXXIV, fig. 80; Obs., XII, 1869, p. 25, pl. XXXIV, fig. 80.
* *Margaron* (*Unio*) *peculiaris* LEA, Syn., 1870, p. 47.
* †*Unio paraguayensis* LEA, Pr. Ac. N. Sci. Phila., X, 1866, p. 34; * Jl. Ac. N. Sci. Phila., VI, 1868, p. 271, pl. XXXV, fig. 85; Obs., XII, 1869, p. 31, pl. XXXV, fig. 85.—* VON MARTENS, S. B. Nat. Fr., 1895, p. 34.
* *Margaron* (*Unio*) *paraguayensis* LEA, Syn., 1870, p. 45.
* ?*Unio nitidulus* KUSTER, Conch. Cab. Unio., 1848, p. 226, pl. LXXVI, fig. 6.—* PÆTEL, Conch. Sam., III, 1890, p. 161.

Paraguay.

†DIPLODON FIRMUS Lea.[3]

* *Unio firmus* LEA, Pr. Ac. N. Sci. Phila., X, 1866, p. 33; * Jl. Ac. N. Sci. Phila., VI, 1868, p. 267, pl. XXXIV, fig. 82; * Obs., XII, 1869, p. 27, pl. XXXIV, fig. 82.
* *Margaron* (*Unio*) *firmus* LEA, Syn., 1870, p. 45.

DIPLODON FIRMUS var. BŒTTGERI von Ihering.

* *Unio firmus* LEA var. *bœttgeri* VON IHERING, Arch. für Nat., 1893, p. 105, pl. IV, fig. 2.—* NEHRING, Jl. de Conch., 1894, p. 83.

Brazil.

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[1] Extremely close to *apprimus*, and probably only a young shell of that species.

[2] I know nothing of this. It looks more like an Australian than a South American form, and is quite likely a *D. australis*. Kuster credits it to Charpentier manuscript.

[3] A little longer and more solid than *peculiaris*, but I doubt whether it is distinct. The types of these two and *paraguayensis* are badly worn.

†DIPLODON URUGUAYENSIS Lea.

**Unio uruguayensis* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 90; *Jl. Ac. N. Sci. Phila., V, 1863, p. 388, pl. XLV, fig. 298; *Obs., X, 1863, p. 241, pl. XLV, fig. 298.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXIV, fig. 448.—*PÆTEL, Conch. Sam., III, 1890, p. 171.

**Margaron* (*Unio*) *uruguayensis* LEA, Syn., 1870, p. 46.

Uruguay River, South America.

†DIPLODON WHEATLEYANUS Lea.

**Unio wheatleyanus* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 94; *Obs., VI, 1857, p. 28, pl. XXIX, fig. 23; *Jl. Ac. N. Sci. Phila., 1858, p. 308, pl. XXIX, fig. 23.—*SOWERBY, Conch. Icon., XVI, 1868, pl. XL, fig. 487.—*STROBEL, Mat. Mal., Pt. 1, 1874, p. 71.

**Margaron* (*Unio*) *wheatleyanus* LEA, Syn., 1870, p. 50.

Argentina.

†DIPLODON RUDUS Lea.

**Unio rudus* LEA, Pr. Ac. Nat. Sci. Phila., III, 1859, p. 187; *Jl. Ac. Nat. Sci. Phila., IV, 1860, p. 266, pl. XLIII, fig. 146; Obs., VII, 1860, p. 84, pl. XLIII, fig. 146.—*KUSTER, Conch. Cab. Unio, 1861, p. 261, pl. LXXXVIII, fig. 1.

**Margaron* (*Unio*) *rudus* LEA, Syn., 1870, p. 50.

**Unio rudis* PÆTEL, Conch. Sam., III, 1890, p. 166.

Rio de la Plata.

†DIPLODON GREEFIANUS von Ihering.

**Unio greefianus* VON IHERING, Arch. für Nat., 1893, p. 96, pl. IV, fig. 18.[1]—*NEHRING, Jl. de Conch., 1894, p. 82.

São Paulo, Brazil.

†DIPLODON PIGER Lea.

**Unio piger* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 90; *Jl. Ac. N. Sci. Phila., V, 1863, p. 388; *Obs., X, p. 23, pl. XLV, fig. 296.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXIV, fig. 449.—*PÆTEL, Conch. Sam., III, 1890, p. 163.

**Margaron* (*Unio*) *piger* LEA, Syn., 1870, p. 46.

Uruguay River, South America.

†DIPLODON PRUNOIDES Lea.

**Unio prunoides* LEA, Pr. Ac. N. Sci. Phila., XII, 1868, p. 150; *Jl. Ac. N. Sci. Phila., VI, 1868, p. 323, pl. LIII, fig. 136; *Obs., XII, 1869, p. 83, pl. LIII, fig. 136.

**Margaron* (*Unio*) *prunoides* LEA, Syn., 1870, p. 47.

South America.?

†DIPLODON BESKEANUS Dunker.

**Unio beskeanus* DUNKER, Zeits. für Mal., V, 1848, p. 182.[2]

**Margaron* (*Unio*) *beskeanus* LEA, Syn., 1870, p. 61.

Brazil.

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[1] Credited to Dunker Manuscript.

[2] There is a specimen in the Lea collection contributed under this name by Dunker himself. It is near *locellus* and *suavidicus*. I do not know that it has ever been figured.

†DIPLODON LOCELLUS Lea.

* *Unio locellus* LEA, Pr. Ac. N. Sci. Phila., X, 1866, p. 34; * Jl. Ac. N. Sci. Phila., VI, 1868, p. 264, pl. XXXIII, fig. 79; * Obs., XII, 1869, p. 24, pl. XXXIII, fig. 79.
* *Margaron* (*Unio*) *locellus* LEA, Syn., 1870, p. 47.

Argentina.

†DIPLODON SUAVIDICUS Lea.

* *Unio suavidicus* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 95; *Obs., VI, 1857, p. 29, pl. XXIX, fig. 24; * Jl. Ac. N. Sci. Phila., III, 1898, p. 309, pl. XXIX, fig. 24.
* *Margaron* (*Unio*) *suavidicus* LEA, Syn., 1870, p. 54.

Amazon.

†DIPLODON BROWNII Lea.

* *Unio brownii* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 95; * Obs., VI, 1857, p. 27, pl. XXIX, fig. 22; * Jl. Ac. N. Sci. Phila., III, 1858, p. 307, pl. XXIX, fig. 22.
* *Margaron* (*Unio*) *brownii* LEA, Syn., 1870, p. 61.

South America?. Dr. Lea reports it from Mocha, Asia (with a question), which is certainly an error.

†DIPLODON LEAI Simpson.[1]

* *Margarita* (*Unio*) *modestus* LEA, Syn., 1836, p. 32; 1838, p. 22.
* *Margaron* (*Unio*) *modestus* LEA, Syn., 1852, p. 33; 1870, p. 54.
* *Unio modestus* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.

Brazil.

†DIPLODON RHUACOICUS d'Orbigny.

* *Unio rhuacoica* D'ORBIGNY, Guer. Mag., 1835, p. 35; * Voy. Am. Mer., 1843, p. 606, pl. LXIX, figs. 4, 5.
* *Margaron* (*Unio*) *rhuacoicus* LEA, Syn., 1870, p. 54.
* *Unio rhyacoicus* VON MARTENS, Mal. Bl., XV, 1868, p. 195.
* *Monocondylæa rhyacaeca* PÆTEL, Conch. Sam., III, 1890, p. 147.

Uruguay.

†DIPLODON CHARRUANUS d'Orbigny.

* *Unio charruana* D'ORBIGNY, Guer. Mag., 1835, p. 35; Voy. Am. Mer., 1843, p. 606, pl. LXXI, figs. 8–14.
* *Margarita* (*Unio*) *charruanus* LEA, Syn., 1838, p. 20.

[1] Lea credits this to Ferussac in his Synopsis, but I do not think it has ever been described by that author or anyone else. In 1856 Kuster properly described and figured a species in the Conchylien Cabinet (Vol. Unio, p. 147, pl. XLIII, fig. 2) under the name of *Unio modestus*, which he credits to Charpentier's manuscript, a different shell from that referred to by Lea and the Adams brothers. If the latter was never described the name *modestus* can not be used for it, as it was first properly applied to another species. The shells in Lea's collection may be described as follows: Shell small, subrhomboid, rather solid; beaks full with radial sculpture, the two middle bars coalescing; surface faintly concentrically sculptured, dark olive; two compressed pseudocardinals in each valve which are strongly obliquely striated; two laterals in the left valve and one in the right; anterior muscle scars distinct; nacre bluish; beak cavities shallow. Length 28, height 17, diameter 13 mm.

* *Margaron* (*Unio*) *charruanus* LEA, Syn., 1852, p. 29; 1870, p. 54.

* *Unio charruanus* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* SOWERBY, Conch. Icon., XVI, 1868, pl. XCIII, figs. 505, 505*a*, 505*b*.—* PÆTEL, Conch. Sam., III, 1890, p. 147.

* *Unio faba* D'ORBIGNY, Mag. Zool., 1835, p. 35.—* HANLEY, Test. Moll., 1842, p. 197.—* D'ORBIGNY, Voy. Am. Mer., 1843, p. 606, pl. LXXI, figs. 8–11.—* HANLEY, Biv. Shell, 1843, p. 197.—* CATLOW and REEVE, Conch. Nom., 1845, p. 58.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* PÆTEL, Conch. Sam., III, 1890, p. 152.

* *Margarita* (*Unio*) *faba* LEA, Syn., 1838, p. 21.

* *Margaron* (*Unio*) *faba* LEA, Syn., 1852, p. 31; 1870, p. 50.

Uruguay.

DIPLODON CAIPIRA von Ihering.

* *Unio caipira* VON IHERING, Arch. für. Nat., 1893, p. 98, pl. IV, fig. 9.—* NEHRING, Jl. de Conch., 1894, p. 83.

Southern Brazil.

† DIPLODON PICEUS Lea.

* *Unio piceus* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 91; * Jl. Ac. N. Sci. Phila., V, 1863, p. 397, pl. XLI, fig. 287; * Obs., X, 1863, p. 15, pl. XLI, fig. 287.

* *Margaron* (*Unio*) *piceus* LEA, Syn., 1870, p. 53.

* *Unio suppositus* VON IHERING (according to von Ihering), where is it described?

Uruguay River, South America.

† ? DIPLODON WAGNERIANUM Simpson.[1]

* *Unio ellipticus* WAGNER, Test. Fluv. Bras., 1827, p. 33, pl. XXVI, figs. 1, 2.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* KUSTER, Conch. Icon. Unio, 1861, p. 238, pl. LXXX, fig. 2.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXIV, fig. 382.—* PÆTEL, Conch. Sam., III, 1890, p. 151.

* *Margaron* (*Unio*) *ellipticus* LEA, Syn., 1852, p. 21; 1870, p. 31.

Brazil.

† DIPLODON ÆTHIOPS Lea.

* *Unio æthiops* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 91; * Jl. Ac. N. Sci. Phila., V, 1863, p. 377, pl. XLI. fig. 285; Obs., X, 1863, p. 13, pl. XLI, fig. 285.—* VON MARTENS, Mal. Bl., XVI, 1868, p. 196.

* *Margaron* (*Unio*) *æthiops* LEA, Syn., 1870, p. 53.

DIPLODON ÆTHIOPS var. PIRICICABANA von Ihering.

* *Unio æthiops*, LEA, var. *piricicabana* VON IHERING, Arch. für Nat., 1893, p. 102.—* NEHRING, Jl. de Conch., 1894, p. 83.

Uruguay and Paraguay rivers; southern Brazil.

[1] Barnes applied the name *Unio ellipticus* in 1823 to a species which is believed to be *Unio ligamentinus*. Wagner placed this shell in the genus *Unio* in the text, but Spix called it *Diplodon ellipticum* in the plate. I therefore change the name to *wagnerianum*. I have never seen a shell that just agrees with his figure. It is near *æthiopiformis* von Ihering.

†DIPLODON DIVARICATUS Lea.[1]

**Unio divaricatus* LEA, Tr. Am. Phil. Soc., V, 1834, p. 64, pl. IX, fig. 24; * Obs., I, 1834, p. 176, pl. IX, fig. 24.—* HANLEY, Test. Moll., 1842, p. 197; * Biv. Shells, 1843, p. 197, pl. XXIII, fig. 36.—* CATLOW and REEVE, Conch. Nom., 1845, p. 58.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* JICKELI, Faun. Moll. N. O. Af., 1874, p. 280.—* PÆTEL, Conch. Sam., III, 1890, p. 151.

**Margarita* (*Unio*) *divaricatus* LEA, Syn., 1836, p. 29; 1838, p. 21.

* *Margaron* (*Unio*) *divaricatus* LEA, Syn., 1852, p. 31; 1870, p. 49.

South America.

†DIPLODON BINNEYI Lea.[2]

**Unio binneyi* LEA, Pr. Am. Phil. Soc., IV, 1845, p. 165; * Tr. Am. Phil. Soc., X, 1848, p. 77, pl. VI, fig. 18; * Obs., IV, 1848, p. 51, pl. VI, fig. 18.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 245.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857. p. 493.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 146.

* *Margaron* (*Unio*) *binneyi* LEA, Syn., 1852, p. 29; 1870, p. 46.

South America.

(Group of *Diplodon granosus*.)

Shell elliptical to subtrapezoidal, somewhat compressed, rather thin, beaks low, the sculpture irregularly radial, the ridges narrow and sharp, separated by wide, trough-like spaces, the outer in particular often becoming somewhat nodulous or corrugated, the inner approaching and united below; surface sometimes slightly concentrically ridged and granose; teeth delicate, compressed; nacre bluish.[3]

Animal unknown.

†DIPLODON GRANOSUS Bruguiere.

**Unio granosa* BRUGUIERE, Jl. de Hist. Nat., I, 1792, p. 107, pl. VI, figs. 3, 4.—* LAMARCK, An. sans Vert., VI, 1819, p. 79.—* DESHAYES, Enc. Meth., II, 1827, p. 151, pl. CCXLIX, fig. 2.

* *Unio granosus* HANLEY, Test. Moll., 1842, p. 182; * Biv. Shells, 1843, p. 182, pl. XXIII, fig. 21.—* CATLOW and REEVE, Conch. Nom., 1845, p. 59.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 496.—* DROUET, Moll. Guyane, 1859, p. 86.

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[1] Credited by Lea to Egypt, but no doubt a South American species, as it has regular radial beak sculpture and appears to belong with this group.

[2] Dr. Lea believes that this shell came from Alabama, but it certainly did not. It is undoubtedly a South American form. The type, the only shell I have seen is dead and in bad condition; but the beaks have radial sculpture, and I think it belongs here.

[3] No wide distinction exists between this and the preceding group, and there are species which might be assigned about as easily to one as the other. In general the forms of this division are more delicate, thinner, and more compressed than those of the *Delodontus* group. There are few clear characters in any of the species. Philippi and others have, it seems to me, unduly multiplied names for these forms, and the lack of suitable material and their extreme simplicity and similarity make it impossible for me to always determine which are valid. The synonymy is in bad shape, but I have done the best I could at straightening it out.

* *Margarita* (*Unio*) *granosus* LEA, Syn., 1836, p. 17; 1838, p. 16.

* *Margaron* (*Unio*) *granosus* LEA, Syn., 1852, p. 23; 1870, p. 34.

* *Unio multistriatus* LEA,[1] Tr. Am. Phil. Soc., IV, 1831, p. 91, pl. XII, fig. 22; * Obs. I, 1834, p. 101, pl. XII, fig. 22.—* HANLEY, Test. Moll., 1842, p. 176; * Biv. Shells, 1843, p. 176, pl. XX, fig. 35.—* CATLOW and REEVE, Conch. Nom., 1845, p. 61.—* CHENU, Ill. Conch., 1858, pl. XI, figs. 2, 2*a*, 2*b*.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXV, fig. 455.—* PÆTEL, Conch. Sam., III, 1890, p. 160.

* *Margarita* (*Unio*) *multistriatus* LEA, Syn., 1836, p. 13; 1838, p. 14.

* *Unio multistriata* D'ORBIGNY, Voy. Am. Mer., 1843, p. 607.

* *Unio pfeifferi* DUNKER, Zeits. für Mal., V, 1848, p. 181.—* PFEIFFER, Nov. Conch., II, 1866, p. 151, pl. XXXIX, figs. 4–9.—* PÆTEL, Conch. Sam., III, 1890, p. 165.

* *Unio psammactinus* PHILIPPI, Conch., III, 1848, p. 79, pl. V, fig. 2.—* KUSTER, Conch. Cab. Unio, 1856, p. 159, pl. XLV, fig. 6.[2]—* VON MARTENS, Mal. Bl., XV, 1868, p. 194.

* † *Unio famelicus* GOULD, Pr. Bost. Soc. N. Hist., III, 1850, p. 294;[3] U. S. Expl. Exp., XII, 1852, p. 432, figs. 544, 544*a*, 544*b*.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 249.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* GOULD, Otia. Conch., 1862, p. 88.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXV, fig. 391.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *famelicus* LEA, Syn., 1852, p. 34; 1870, p. 54.

* *Unio niloticus* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXIII, fig. 374.

Brazil; Guiana.

DIPLODON GRANULIFERUS Dunker.

* *Unio granuliferus* DUNKER, Zeits. für Mal., V, 1848, p. 182.—* PFEIFFER, Nov. Conch., II, 1866, p. 150, pl. XXXIX, figs. 1–3.

* *Unio granulifer* PÆTEL, Conch. Sam., III, 1890, p. 154.

Province of Rio de Janeiro, Brazil.

† DIPLODON EFFULGENS Lea.

* *Unio effulgens* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 94; * Jl. Ac. N. Sci. Phil., III, 1857, p. 303, pl. XXVIII, fig. 18; * Obs., VI, 1857, p. 23, pl. XXVIII, fig. 18.—PÆTEL, Conch. Sam., III, 1890, p. 151.—* VON IHERING, Arch. für Nat., 1893, p. 106.

* *Margaron* (*Unio*) *effulgens* LEA, Syn., 1870, p. 35.

* *Unio eurhynchus* KUSTER, Conch. Cab. Unio, 1861, p. 237, pl. LXXIX, fig. 5.—* PÆTEL, Conch. Sam., III, 1890, p. 152.

Brazil.

[1] The type presented by Mrs. Mawe is not in the Lea collection, but there are fairly typical examples in it. The species varies much in form and sculpture, some specimens being smooth, and all variations occur to those quite granose throughout. Lea places his species in the synonymy *U. ellipticus* Spix, which I think is an error. The type of *multistriatus* is more elongated than the figure of *U. granosus* in the Encyclopedie Méthodique, but agrees very well with undoubted specimens of this species which I have seen.

[2] Credited by Kuster to Brown *in litt.*

[3] Credited by Gould to Walla Walla, Oregon. It is a young, rather smooth *granosus* I am sure, and the habitat given is wrong. The type is in the U. S. National Museum.

† DIPLODON RUFOFUSCUS Lea.

* *Unio rufofuscus* LEA, Pr. Ac. N. Sci. Phila., IX, 1865, p. 76; *Jl. Ac. N. Sci. Phila., VI, 1868, p. 282, pl. XXXIX, fig. 96; *Obs., XII, 1869, p. 42, pl. XXXIX, fig. 96.
* *Maragon* (*Unio*) *rufofuscus* LEA, Syn., 1870, p. 31.

South America.

DIPLODON DEMARARAENSIS Lea.

* *Unio demararaensis* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 152; *Jl. Ac. N. Sci. Phila., IV, 1860, p. 253, pl. XXXIX, fig. 133; *Obs., VII, 1860, p. 71, pl. XXXIX, fig. 133.—*REEVE, Conch. Icon., XVI, 1865, pl. XXII, fig. 99.
* *Maragron* (*Unio*) *demararaensis* LEA, Syn., 1870, p. 36.
* *Unio demararaensis* PÆTEL, Conch. Sam., III, 1890, p. 150.

Demerara.

† DIPLODON LEPIDIOR Lea.

* *Unio lepidus* LEA,[1] Pr. Ac. N. Sci. Phila., IV, 1860, p. 91; * Jl. Ac. N. Sci. Phila., V, 1863, p. 390, pl. L, fig. 306; *Obs., X, 1863, p. 25, pl. L, fig. 306.
* *Margaron* (*Unio*) *lepidior* LEA, Syn., 1870, p. 53.

Uruguay River.

† DIPLODON PARCUS Lea.

* *Unio parcus* LEA, Pr. Ac. N. Sci. Phila., X, 1866, p. 34; *Jl. Ac. N. Sci. Phila., VI, 1868, p. 262, pl. XXXIII, fig. 77; * Obs., XII, 1869, p. 22, pl. XXXIII, fig. 77.
* *Margaron* (*Unio*) *parcus* LEA, Syn., 1870, p. 47.

South America.

† DIPLODON CHILENSIS Gray.

* *Unio chilensis* GRAY, Spic. Zool., 1828, pl. VI, fig. 12.—* PHILIPPI, Conch., III, 1847, p. 9, pl. IV, fig. 2.—* HUPE, Gay's Hist. Chile, VIII, 1854, p. 317.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* KUSTER, Conch. Cab. Unio, 1862, p. 282, pl. XCV, fig. 12.—* SOWERBY, Conch. Icon., XVI, 1867, pl. LVI, fig. 286.—* PÆTEL, Conch. Sam., III, 1890, p. 148.
* *Unio smithii* GRAY and PIDGEON, Griff. Cuv., XII, 1834, p. 600, pl. XX, fig. 3.[2]—* HANLEY, Biv. Shells, 1843, p. 195, pl. XXIII, fig. 58.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 495.—* PÆTEL, Conch. Sam., III, 1890, p. 167.
* *Margarita* (*Unio*) *smithii* LEA, Syn., 1836, p. 27; 1838, p. 20.
* *Margaron* (*Unio*) *smithii* LEA, Syn,, 1852, p. 30; 1870, p. 48.
* *Unio auratus* PHILIPPI, Conch., III, 1847, p. 9, pl. IV, fig. 1.[3]—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—* PÆTEL, Conch. Sam., III, 1890, p. 145.
* *Margarita* (*Unio*) *auratus* LEA, Syn., 1836, p. 31; 1838, p. 22.
* *Margaron* (*Unio*) *auratus* LEA, Syn., 1852, p. 33; 1870, p. 53.
* *Unio araucanus* PHILIPPI, Conch., III, 1847, p. 50, pl. IV, fig. 3.—* KUSTER, Conch. Cab. Unio, 1862, p. 283, pl. XCV, fig. 3.
* *Margaron* (*Unio*) *araucanus* LEA, Syn., 1870, p. 53.
* *Unio araucana* HUPE, Gay's Hist. Chile, 1854, p. 317.

Chile.

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[1] Changed to *lepidior* because the name *lepidus* had been used for a *Unio* by Gould.

[2] Only the briefest description is given of this in the index. From the figure it seems to be identical with *chilensis*.

[3] Generally credited to Swainson, and Philippi refers it to him with doubt. But I can not find that Swainson ever published it.

DIPLODON SOLIDULUS Philippi.

* *Unio solidulus* PHILIPPI, Mal. Bl., XVI, 1869, p. 46.—* PFEIFFER, Nov. Conch., III, 1869, p. 480, pl. CIII, figs. 9, 10.—* PÆTEL, Conch. Sam., III, 1890, p. 168.

Near Santiago; Chile.

DIPLODON GASSIESI Kuster.

* *Unio gassiesi* KUSTER(part), Conch. Cab. Unio, 1856, p. 148, pl. XLIII, fig. 4.[1]
* *Unio auratus* REEVE, Conch. Icon., XVI, 1865, pl. XXIX, fig. 150.

Chile.

DIPLODON APLATUS Reeve.[2]

* *Unio aplatus* REEVE, Conch. Icon., XVI, 1865, pl. XXVIII, fig. 143.—* PÆTEL, Conch. Sam., III, 1890, p. 144.

Island of Chiloe, Chile.

†DIPLODON MOLINÆ Philippi.

* *Unio molinæ* PHILIPPI, Conch., III, 1847, p. 50, pl. IV, fig. 4.—* HUPE, Gay's Hist. Chile, VIII, 1854, p. 316.—* KUSTER, Conch. Cab. Unio, 1862, p. 281, pl. XCV, fig. 1.—* PÆTEL, Conch. Sam., III, 1890, p. 159.
* *Unio auratus* SOWERBY, Conch. Icon., XVI, 1866, pl. XLV, fig. 245.[3]

Southern Chile.

†DIPLODON MODESTUS Kuster.[4]

* *Unio modestus* KUSTER, Conch. Cab. Unio, 1856, p. 147, pl. XLIII, fig. 2.
* *Unio ianthinus* PHILIPPI, Mal. Bl., XVII, 1869, p. 47.—* PFEIFFER, Nov. Conch., III, 1869, p. 485, pl. CIV, figs. 11, 12.—* PÆTEL, Conch. Sam., III, 1890, p. 155.
* *Unio valdivianus* PHILIPPI, Mal. Bl., XVI, 1869, p. 48.—* PFEIFFER, Nov. Conch., III, 1869, p. 479, pl. CIII, figs. 7, 8.
* *Unio montanus* PHILIPPI, Mal. Bl., XVI, 1869, p. 48.—* PFEIFFER, Nov. Conch., III, 1869, p. 482, pl. CIV, figs. 3, 4.—* PÆTEL, Conch. Sam., III, 1890, p. 159.

Chile.

†DIPLODON ATRATUS Sowerby.

* *Unio atratus* SOWERBY, Conch. Man., 1839, fig. 148.[5]
* *Unio limensis* KUSTER, Conch. Cab. Unio, 1856, p. 146, pl. XLII, fig. 7; XLIII, fig. 1.—* PÆTEL, Conch. Sam., III, 1890, p. 157.
* *Unio jacobæus* PHILIPPI, Mal. Bl., XVI, 1869, p. 44.—* PFEIFFER, Nov. Conch., III, 1869, p. 478, pl. CIII, figs. 3, 4.—* PÆTEL, Conch. Sam., III, 1890, p. 155.
* *Unio landbecki* PHILIPPI, Mal. Bl., XVI, 1869, p. 45.—* PFEIFFER, Nov. Conch., III, 1869, p. 479, pl. CIII, figs. 5, 6.—* PÆTEL, Conch. Sam., III, 1890, p. 156.

[1] Kuster figures two species, I think, for *gassiesi*. His fig. 3 is, I think, a young *molinæ* Kuster; fig. 4 seems to equal *auratus* of Reeve, not of Philippi or Sowerby.
[2] Swainson manuscript according to Reeve.
[3] Not *U. auratus* of Reeve, figured previously in the same work.
[4] Credited to Charpentier manuscript by Kuster. See foot note on *Diplodon leai* Simpson, p. 876.
[5] Not *Unio* (*Niaa*) *atrata* Swainson, which equals *Unio gracilis* Barnes. Sowerby's name has precedence.

* *Unio diplodon* PHILIPPI, Mal. Bl., XVI, 1869, p. 46.—* PFEIFFER, Nov. Conch., III, 1869, p. 483, pl. CIV, figs. 7, 8.—* PÆTEL, Conch. Sam., III, 1890, p. 150.

*† *Unio dunkerianus* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 94; * Obs., VI, 1857, p. 25, pl. XXIII, fig. 20; * Jl. Ac. N. Sci. Phila., III, 1858, p. 303, pl. XXVIII, fig. 20.—* KUSTER, Conch. Cab. Unio, 1862, p. 290, pl. XCII, fig. 6.—* SOWERBY, Conch. Icon., XVI, 1868, pl. XC, fig. 485.—* PÆTEL, Conch. Sam., III, 1890, p. 151.—* VON IHERING, Arch. für Nat., 1893, p. 109.

* *Margaron* (*Unio*) *dunkerianus* LEA, Syn., 1870, p. 32.

Peru; Chile.

DIPLODON OBTUSUS d'Orbigny.

* *Unio obtusa* D'ORBIGNY,[1] Guer. Mag., 1835, p. 35; * Voy. Am. Mer., 1843, p. 610.—* HUPE, Gay's Hist. Chile, VIII, 1854, p. 316.

Chile.

DIPLODON RHUACONICUS Kuster.[2]

* *Unio rhuaconicus* KUSTER, Conch. Cab. Unio, 1856, p. 145, pl. XLII, fig. 5.

Brazil.

† DIPLODON CHILOËNSIS Kuster.

* *Unio chiloënsis* KUSTER, Conch. Cab., 1856, p. 161, pl. XXXV, fig. 6.—* PÆTEL, Conch. Sam., III, 1890, p. 148.

Island of Chiloe, Chile.

† DIPLODON CASÆBLANCÆ Philippi.

* *Unio casæblancæ* PHILIPPI, Zeits. für Mal., V, 1848, p. 176.

* *Unio casablancæ* PFEIFFER, Nov. Conch., III, 1869, p. 481, pl. CIV, figs. 1, 2.—* PÆTEL, Conch. Sam., III, 1890, p. 147.

* *Margaron* (*Unio*) *casablancæ* LEA, Syn., 1870, p. 53.

* *Unio longus* PHILIPPI, Mal. Bl., XVI, 1869, p. 44.—* PFEIFFER, Nov. Conch., III, 1869, p. 477, pl. CIII, figs. 1, 2.—* PÆTEL, Conch. Sam., III, 1890, p. 158.

* *Unio colchaguensis* PHILIPPI, Mal. Bl., XVI, 1869, p. 47.—* PFEIFFER, Nov. Conch., III, 1869, p. 484, pl. CIV, figs. 9, 10.—* PÆTEL, Conch. Sam., III, 1890, p. 148.

* *Unio foncki* PHILIPPI, Mal. Bl., XV, 1869, p. 49.—* PFEIFFER, Nov. Conch., III, 1869, p. 483, pl. CIV, figs. 5, 6.

* *Unio funcki* PÆTEL, Conch. Sam., III, 1890, p. 153.

Chile.

DIPLODON FRENZELLII von Ihering.

* *Unio frenzellii* VON IHERING, Arch. für Nat., 1893, p. 3, pl. IV., fig. 12.

Patagonia and Chile.

DIPLODON MARTENSI von Ihering.

* *Unio martensi* VON IHERING, Arch. für Nat., 1893, p, 100, pl. IV, fig. 10.

Southern Brazil.

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[1] Said by d'Orbigny to be of Ferussac, but he does not say where that author described it, and I do not know where. This name has been used for at least four different species of *Unionidæ*: As above; in Cuvier's Animal Kingdom (edition without date); for *Unio retusus*, by Potiez and Michaud; and by Dr. Lea. I presume that d'Orbigny is entitled to the name.

[2] Kuster credits this to "Pfeiffer teste Charpentier." I do not know what it is. It is very different from d'Orbigny's *rhuacoica*.

† DIPLODON CUPRINUS Simpson.

* *Unio fragilis* SOWERBY,[1] Conch. Icon., XVI, 1856, pl. XXX, fig. 155.

Island of Chiloe, Chile.

DIPLODON AUREUS Simpson.

* *Unio auratus* KUSTER, Conch. Cab. Unio, 1856, p. 161, pl. XLVI, fig. 3.[2]

Chile.

DIPLODON CORIACEUS Dunker.

* *Unio coriaceus* DUNKER, Zeits. für. Mal., V, 1848, p. 181.—* VON IHERING, Arch. für Nat., 1893, p. 115.

Rio Negro, Province of Rio Janeiro, Brazil.

DIPLODON CHILDRENI Gray.

* *Unio childreni* GRAY, Griff. Cuv., XII, 1834, p. 600 (index), pl. XX, fig. 1.—* CATLOW and REEVE, Conch. Icon., 1845, p. 57.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* PAETEL, Conch. Sam., III, 1890, p. 148.
Margarita (*Unio*) *childreni* LEA, Syn., 1836, p. 25; 1838, p. 19.
* *Margaron* (*Unio*) *childreni* LEA, Syn., 1852, p. 28; 1870, p. 44.

South America.

(Group of *Diplodon burroughianus.*)

Shell elliptical, moderately solid, inflated, sharply pointed behind, with a high, well-developed posterior ridge; beaks rather full; the sculpture consisting of regularly radiating, widely separated, sharp ridges, the intervening grooves rounded out; epidermis smooth, dark olive with lighter bands; pseudocardinals compressed, rough, vertically ridged, usually trifid or quadrifid in each valve; laterals curved, compressed, muscle scars smooth; nacre white, silvery.

Animal unknown.

† DIPLODON BURROUGHIANUS Lea.

* *Unio burroughianus*, LEA, Tr. Am. Phil. Soc., V, 1834, p. 67, pl. X, fig. 27; * Obs., I, 1834, p. 179, pl. X, fig. 27.—* D'ORBIGNY, Guer. Mag., 1835, p. 34.—* HANLEY, Test. Moll., 1842, p. 197; * Biv. Shells, 1843, p. 197, pl. XXII, fig. 2.—* D'ORBIGNY, Voy. Am. Mer., 1843, p. 609.—* CATLOW and REEVE, Conch. Nom., 1845, p. 56.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXII, fig. 169.—* PAETEL, Conch. Sam., III, 1890, p. 146.
* *Margarita* (*Unio*) *burroughianus*, LEA, Syn., 1836, p. 29; 1838, p. 21.
* *Margaron* (*Unio*) *burroughianus*, LEA, Syn., 1852, p. 31; 1870, p. 50.

Parana River, South America.

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[1] Sowerby's name being preoccupied in *Unio*, I change it to *cuprinus*, which has not been used in *Diplodon*. The date, 1856 on the plate, is perhaps a typographical error for 1866.

[2] The name *auratus* is preoccupied in *Unio*, by Philippi in the Conchylien. This being a different species, I change it to *aureus*.

† DIPLODON TRIFIDUS Lea.

* *Unio trifidus*, LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 89; * Jl. Ac. N. Sci. Phila., V, 1863, p. 386, pl. XLIV, fig. 295; * Obs., X, 1863, p. 22, pl. XLIV, fig. 295.
* *Margaron* (*Unio*) *trifidus*, LEA, Syn., 1870, p. 50.

Argentina.

(Group of *Diplodon pazi*.)

Shell subtrapezoidal, rounded in front and strongly biangulate behind, the wavy beak sculpture extending well over the disk; epidermis olive; pseudocardinals ragged, with a tendency to break into denticles.

DIPLODON PAZI Hidalgo.

* *Castalia pazi* HIDALGO, Jl. de Conch., XVI, 1868, p. 353, pl. XIII, fig. 6.—* PÆTEL, Conch. Sam., III, 1890, p. 189.

Imbabura, Ecuador.

DIPLODON HYLÆAUS d'Orbigny.

* *Unio hylæa* D'ORBIGNY, Guer. Mag., 1835, p. 36; * Voy. Am. Mer., 1843, p. 607, pl. LXIX, figs. 8, 9.
* *Margaron* (*Unio*) *hylæus* LEA, Syn., 1852, p. 21; 1870, p. 31.
* *Unio hylæus* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* SOWERBY, Conch. Icon., XVI, 1868, pl. XCIII, fig. 506.—* PÆTEL, Conch. Sam., III, 1890, p. 155.
* *Unio guaraniana* D'ORBIGNY, Guer. Mag., 1835, p. 37; * Voy. Am. Mer., 1843, p. 608, pl. LXIX, figs. 10–12.

Bolivia; Paraguay River.

(Group of *Diplodon parallelipipedon*.)

Shell elongated, subtrapezoidal, inflated, obliquely truncated behind; posterior ridge strong; beaks rather low, sculpture of nearly or quite strictly radial bars with concave spaces between; epidermis dark; pseudocardinals compressed in the young, granular, vertically striate and breaking into denticles in the old shell; laterals long, curved, granular, often vertically striate; anterior scars smooth, distinct.

† DIPLODON PARALLELIPIPEDON Lea.

* *Unio parallelipipedon* LEA, Tr. Am. Phil. Soc., V, 1834, p. 60, pl. VIII, fig. 20; * Obs., I, 1834, p. 172, pl. VIII, fig. 20.—* D'ORBIGNY, Guer. Mag., 1835, p. 34.—* HANLEY, Test. Moll., 1842, p. 205; Biv. Shells, 1843, p. 205.—* D'ORBIGNY, Voy. Am. Mer., 1843, p. 609.—* CATLOW and REEVE, Conch. Nom., 1845, p. 62.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 491.—* KUSTER, Conch. Cab. Unio, 1861, p. 220, pl. LXXIV, fig. 2.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXIX, fig. 478.—* PÆTEL, Conch. Sam., III, 1890, p. 162.
* *Margarita* (*Unio*) *parallelipipedon* LEA, Syn., 1836, p. 35; 1838, p. 24.
* *Margaron* (*Unio*) *parallelipipedon* LEA, Syn., 1852, p. 56; 1870, p. 58.
? *Unio bonplandi* VALENCIENNES, in continuation of Humboldt's Zool. Obs., 1827.[1]

Rio de la Plata system.

[1] According to Lea. I have not seen this paper, and Lea does not cite the page. A specimen with the above label from the Morelet collection = *parallelipipedon* Lea.

†DIPLODON PATAGONICUS d'Orbigny.

* *Unio patagonica* D'ORBIGNY, Guer. Mag., 1835, p. 37; * Voy. Am. Mer., 1843, p. 610, pl. LXX, figs. 1–4.

* *Margarita* (*Unio*) *patagonicus* LEA, Syn., 1838, p. 25.

* *Unio patagonicus* HANLEY, Test. Moll., 1842, p. 208; * Biv. Shells, 1843, p. 298, pl. XXII, fig. 16.—* CATLOW and REEVE, Conch. Nom., 1845, p. 62.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 461.—* REEVE, Conch. Icon., XVI, 1865, pl. XXI, fig. 93.—* STROBEL, Mat. Mal., Pt. 1, 1874, p. 72.—* PÆTEL, Conch. Sam., III, 1890, p. 162.

* *Margaron* (*Unio*) *patagonicus* LEA, Syn., 1852, p. 38; 1870, p. 61.

Patagonia.

†DIPLODON ACUTIROSTRIS Lea.

* *Unio acutirostris* LEA, Pr. Ac. N. Sci. Phila., X, 1866, p. 34; * Jl. Ac. N. Sci. Phila., VI, 1868, p. 270, pl. XXXV, fig. 84; * Obs., XIII, 1869, p. 30, pl. XXXV, fig. 84.

* *Margaron* (*Unio*) *acutirostris* LEA, Syn., 1870, p. 58.

South America.

(Group of *Diplodon quadrans.*)

Shell subtrapezoid, slightly truncate in front, nearly equilateral, greatly inflated, its greatest diameter below the beaks, from which it is wedge-shaped in front and behind, solid, with a decidedly rounded posterior ridge; epidermis brownish, concentrically striate, beaks full but not high, ligament long and slender; pseudocardinals large, compressed, striate and crenulate, double in the right valve, single in the left; laterals curved, crenulate; beak cavities rounded; anterior cicatrices deep, confluent; nacre white.

Animal unknown.

DIPLODON QUADRANS Lea.[1]

* *Unio quadrans* LEA, Pr. Ac. N. Sci. Phila., IV, 1859, p. 306; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 360, pl. LXI, fig. 185; * Obs., VIII, 1860, p. 42, pl. LXI, fig. 185.—* B. H. WRIGHT, Check List, 1888.

* *Margaron* (*Unio*) *quadrans* LEA, Syn., 1870, p. 36.

South America (?).

Subgenus CYCLOMYA Simpson, 1900.

(Type, *Unio funebralis* Lea.)

Shell obovate to suborbicular, narrowed in front, produced just behind the center of the base, generally slightly pointed about the middle of the posterior end, with a scarcely perceptible posterior ridge and a slight dorsal wing behind; beaks high, irregularly radial; hinge line

[1] Only one specimen of this shell is reported, this being in the Wheatley collection, and credited to Texas. The beak sculpture is all eroded away, but I am almost sure it is a South American shell, allied, perhaps, to *D. apprimus*, *uruguayensis*, and possibly to Hupe's *Unio orbignyi*.

strongly arched, curved behind and incurved in front of the beaks; the lower pseudocardinal in the right valve largest, often much split up into denticles, pseudocardinals of the left valve variable, dentellate; two lower anterior scars deep, united, the upper very deep, separate.

Animal unknown.

Section CYCLOMYA Simpson, 1900.

(Type, *Unio funebralis* Lea.)

†DIPLODON GRATUS Lea.

**Unio gratus* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 91; *Jl. Ac. N. Sci. Phila., V, 1863, p. 382, pl. XLIII, fig. 290; * Obs., X, 1863, pl. XLIII, fig. 290.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXIV, fig. 444.—*PÆTEL, Conch. Sam., III, 1890, p. 154.

**Margaron* (*Unio*) *gratus* LEA, Syn., 1870, p. 56.

Uruguay River, South America.

†DIPLODON PATELLOIDES Lea.

**Unio patelloides* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 89; *Jl. Ac. N. Sci. Phila., V, 1863, p. 383, pl. XLIII, fig. 291; *Obs., X, 1863, p. 19, pl. XLIII, fig. 291.

**Margaron* (*Unio*) *patelloides* LEA, Syn., 1870, p. 56.

Amazon River.

†DIPLODON PERÆFORMIS Lea.

**Unio peræformis* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 90; *Jl. Ac. N. Sci. Phila., V, 1863, p. 384, pl. XLIII, fig. 292; *Obs., X, 1863, p. 20, pl. XLIII, fig. 292.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXIV, fig. 443.—*PÆTEL, Conch. Sam., III, 1890, p. 163.

**Margaron* (*Unio*) *peræformis* LEA, Syn., 1870, p. 55.

Uruguay River, South America.

†DIPLODON FONTAINIANUS d'Orbigny.

**Unio fontainiana* D'ORBIGNY, Guer. Mag., 1835, p. 36.

**Unio fontainianus* HANLEY, Biv. Shells, 1856, p. 384, pl. XXI, fig. 27.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXVII, fig. 466.—* PÆTEL, Conch. Sam., III, 1890, p. 153.—* VON IHERING, Arch. für Nat., 1893, p. 90.

**Margaron* (*Unio*) *fontainianus* LEA, Syn., 1870, p. 56.

**Unio fontaineana* D'ORBIGNY, Voy. Am. Mer., 1843, p. 605, pl. LXIX, figs. 6, 7.—* HUPE, Anim. Nouv., 1857, p. 82.

Parana River, southern Brazil.

†DIPLODON ROTUNDUS Wagner.

**Unio rotundus* WAGNER,[1] Test. Fluv. Bras., 1827, p. 34, pl. XXV, figs. 3, 4.—*MORICAND, Mem. His. Soc. Gen., 1838, p. 49, pl. IV, figs. 12–14.—* KUSTER, Conch. Cab. Unio, 1856, p. 160, pl. XLVI, figs. 1, 2.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXII, fig. 369.—PÆTEL, Conch. Sam., III, 1890, p. 166.

**Margaron* (*Unio*) *rotundus* LEA, Syn., 1870, p. 56.

Brazil.

[1] *Diplodon rotundum* Spix in explanation of plate.

†DIPLODON DISCULUS Lea.

* *Unio disculus*, LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 91; * Jl. Ac. N. Sci. Phila., V, 1863, p. 385, pl. XLIV, fig. 293; * Obs., X, 1863, p. 21, pl. XLIV, fig. 293.
* *Margaron Unio disculus* LEA, Syn., 1870, p. 55.

Uruguay River, South America.

†DIPLODON FUNEBRALIS Lea.

* *Unio funebralis* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 91; * Jl. Ac. N. Sci. Phila., V, 1863, p. 378, pl. XLI, fig. 286; * Obs., X, 1863, p. 14, pl. XLI, fig. 286.—* SOWERBY, Conch. Icon., XVI, 1867, pl. LVII, fig. 290.—* PÆTEL, Conch. Sam., III, 1890, p. 153.
* *Margaron Unio funebralis* LEA, Syn., 1870, p. 55.

Uruguay River.

†DIPLODON PARANENSIS Lea.

* *Unio paranensis* LEA, Tr. Am. Phil. Soc., V, 1834, p. 49, pl. XIV, fig. 42.—* Obs., I, 1834, p. 211, pl. XIV, fig. 42.—* HANLEY, Test. Moll., 1842, p. 202; * Biv. Shells, 1843, p. 202, pl. XXI, fig. 3.—* D'ORBIGNY, Voy. Am. Mer., 1843, p. 603.—* CATLOW and REEVE, Conch. Nom., 1845, p. 62.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—* KUSTER, Conch. Cab., 1861, p. 253, pl. LXXXV, fig. 3.—* SOWERBY, Conch. Icon., XVI, 1866, pl. LI, fig. 268; * PÆTEL, Conch. Sam., III, 1890, p. 162.
* *Margarita* (*Unio*) *paranensis* LEA, Syn., 1836, p. 33; 1838, p. 23.
* *Margaron* (*Unio*) *paranensis* LEA, Syn., 1852, p. 34; 1870, p. 55.
* † *Unio nocturnus* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 91; * Jl. Ac. N. Sci. Phila., V, 1863, p. 380, pl. XLII, fig. 288; * Obs., X, 1863, p. 16, pl. XLII, fig. 288.
* *Margaron* (*Unio*) *nocturnus* LEA, Syn., 1870, p. 56.

Uruguay and Parana rivers.

Section **BULLOIDEUS** Simpson, 1900.

(Type, *Unio bulloides* Lea.)

Shell rounded, inflated, thin, nearly equilateral, truncate behind and slightly so before, with a rather sharp posterior ridge and a dorsal wing; beaks full, rather high, regularly radial; epidermis smooth, bronzy olive; pseudocardinals compressed, much elongated, disposed to be split into denticles, two in the right valve and one in the left; laterals two in the left valve and one in the right; dorsal scars few and scattered in the rather shallow cavities; nacre bluish.

†DIPLODON BULLOIDES Lea.

* *Unio bulloides* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 187; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 264, pl. XLII, fig. 144; * Obs., VII, 1860, p. 82, pl. LXII, fig. 144.—* KUSTER, Conch. Cab. Unio, 1861, p. 186, pl. LIX, fig. 2.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXVIII, fig. 275.—* PÆTEL, Conch. Sam., III, 1890, p. 146.
Margaron (*Unio*) *bulloides* LEA, Syn., 1870, p. 55.

Rio de la Plata.

†DIPLODON SOLISIANUS d'Orbigny.

* *Unio solisiana* D'ORBIGNY, Guer. Mag., 1835, p. 35; * Voy. Am. Mer., 1843, p. 604, pl. LXIX, figs. 1-3.—* SOWERBY, Conch. Icon., XVI, 1868, pl. XCIII, fig. 508.

Rio de la Plata and its affluents.

DIPLODON VARIABILIS Maton.

* *Mya variabilis* MATON, Tr. Linn. Soc. Lond., X, 1811, p. 327, pl. XXIV, figs. 4–7.[1]—* WOOD, Gen. Conch., I, 1815, p. 111.—* DILLWYN, Cat., I, 1817, p. 53.—* WOOD, Ind. Test., 1825, p. 13, pl. II, fig. 38*a*; rev. ed., 1856, p. 17, pl. III, fig. 38.

* *Unio variabilis* D'ORBIGNY, Voy. Am. Mer., 1843, p. 604, pl. LXXI, figs. 1–3.—* HANLEY, Test. Moll., 1842, p. 202; * Biv. Shells, 1843, p. 202.—* CATLOW and REEVE, Conch. Nom., 1845, p. 65.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXIV, fig. 381.—* STROBEL, Mat. Mal., Pt. 1, 1874, p. 69.—* PÆTEL, Conch. Sam., III, 1890, p. 171.

* *Margarita* (*Unio*) *variabilis* LEA, Syn., 1836, p. 33; 1838, p. 23.

* *Margaron* (*Unio*) *variabilis* LEA, Syn., 1852, p. 35; 1870, p. 56.

* *Mytilus matoniana* D'ORBIGNY, Guer. Mag., 1835, p. 35.

* *Unio matonianus* PÆTEL, Conch. Sam., III, 1890, p. 158.

* ? *Unio membranacea* HANLEY, Biv. Shells, 1843, p. 202, pl. XXII, fig. 6.

* *Unio membranaceus* PHILIPPI, Conch., III, 1848, p. 80, pl. V, fig. 4.—* KUSTER, Conch. Cab. Unio., 1862, p. 284, pl. XCV, fig. 5.

Rio de la Plata.

Subgenus HYRIDELLA Swainson, 1840.

(Type, *Unio australis* Lamarck.)

Beaks rather low, sculpture consisting of curved, generally nodulous ridges, which approach below but usually have a smooth area of shell between them; surface sulcate or sometimes corrugated and nodulous; epidermis rayless; teeth rather delicate, compressed, often somewhat rudimentary.

Animal having the embryos occupying the inner gills for the most part,[2] which are united for their entire length to the abdominal sac; outer gills pointed below in the middle; palpi triangular; branchial opening papillose; anal opening smooth, not separated from the super anal opening.

Section HYRIDELLA Swainson, 1840.

Shell covered with concentric, sulcate sculpture; pseudocardinals well developed, compressed; laterals delicate, sometimes imperfect.

(Group of *Diplodon dorsuosus*.)

Shell somewhat rhomboid, inflated solid, with rather full beaks, the sculpture consisting of very strong, subradial, corrugated ridges which curve toward each other below, those in the center sometimes joining, this sculpture extending well out on the disk; upper part of posterior slope having slight radial folds.

[1] I feel certain that Maton has illustrated two species, figs. 4, 6, and 7 being nearly circular, with a rather straight hinge, while fig. 5 is a small shell, is much inflated at the posterior base, and is incurved in front of the breaks. He describes the large shell first. The small one may be the young of *D. patelloides*.

[2] According to Suter in a letter.

† DIPLODON DORSUOSUS Gould.

* *Unio dorsuosus* GOULD, Pr. Bost. Soc. N. H., III, 1850, p. 296; * U. S. Expl. Exp., XII, 1852, p. 430, figs. 540, 540*a*, 540*b*; * Otia Conch., 1862, p. 89.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* P.ETEL, Conch. Sam., III, 1890, p. 151.

* *Margaron* (*Unio*) *dorsuosus* LEA, Syn., 1852, p. 21.

* *Unio napeanensis* CONRAD, Pr. Ac. N. Sci. Phila., V, 1852, p. 10; * Jl. Ac. N. Sci. Phila., 1854, p. 296, pl. XXVI, fig. 4.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 498.—* REEVE, Conch. Icon., XVI, 1865, pl. XXIII, fig. 2.—* P.ETEL, Conch. Sam, III, 1890, p. 160.

* *Margaron* (*Unio*) *napeanensis* LEA, Syn., 1852, p. 20; 1870, p. 30.

Nepean River, Australia.

DIPLODON GLENELGENSIS Dennant.

* *Unio glenelgensis* DENNANT, Pr. Roy. Soc. Viet., X, 1898, p. 112, pl. IV.

Glenelg River, Victoria.

(Group of *Diplodon menziezi*.)

Shell subrhomboid; beak sculpture not strong, consisting of broken, nodulous ridges curving toward each other below, with generally a smooth space between, not extending over the shell.

Animal as in the subgenus.

† DIPLODON MENZIEZI Gray.

* *Unio menziezi* GRAY, In Dieffenbach's N. Z., II, 1843, p. 257.—* ? MUSGRAVE, Phot. Conch., 1863, pl. II, fig. 1.—* HUTTON, N. Z. Moll., 1880, p. 160.—* P.ETEL, Conch. Sam., 1890, p. 159.

* *Unio menziezianus* REEVE, Conch. Icon., XVI, 1865, pl. XXIX, fig. 152.

* *Margaron* (*Unio*) *menziezi* LEA, Syn., 1870, p. 46.

* *Unio aucklandica* GRAY, In Dieffenbach's N. Z., II, 1843, p. 257.—* HUTTON, N. Z. Moll., 1880, p. 161.

* ? *Unio aucklandicus* SOWERBY, Conch. Icon., XVI, 1866, pl. XXX, fig. 156.—* P.ETEL, Conch. Sam., III, 1890, p. 145.

* *Margaron* (*Unio*) *aucklandicus* LEA, Syn., 1870, p. 45.

† DIPLODON MENZIEZI var. RUGATUS Hutton.[1]

* *Unio rugatus* HUTTON, Tr. N. Z. Inst., XVI, 1884, p. 216.—* P.ETEL, Conch. Sam., III, 1890, p. 166.

† DIPLODON MENZIEZI var. HOCHSTELLERI Krauss.

* *Unio hochstelleri* DUNKER, Mal. Bl., VIII, 1862, p. 153.—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXVI, fig. 463.—* HUTTON, N. Z. Moll., 1880, p. 161.—* P.ETEL, Conch. Sam., III, 1890, p. 155.[2]

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[1] The name *rugatus* was applied previously to a European *Unio* by Rossmassler; but it may be used as a varietal name. This seems to be a small form of *menziezi* which sometimes merges into *hochstelleri*.

[2] Suter believes this to be only a pathologic form of *menziezi*. He says in a letter to the author that he has seen the same kind of disease among small *rugatus*.

†DIPLODON MENZIEZI var. DEPAUPERATUS Hutton.

**Unio depauperatus* HUTTON, Tr. N. Z. Inst., XVI, 1884, p. 216.—*PÆTEL, Conch. Sam., III, 1890, p. 150.

New Zealand.

DIPLODON WAIKARENSIS Colenso.

**Unio waikarensis* COLENSO, Tasm. Jl. N. Sci., II, 1841, p. 250, footnote; Tr. N. Z. Inst., XIV, 1882, p. 169.[1]

Waikare Lake, New Zealand.

†DIPLODON ZELEBORI Dunker.

**Unio zelebori* DUNKER, Reise der Nov., 1867, p. 15, pl. II, fig. 28.—*HUTTON, N. Z. Moll., 1880, p. 161.—*PÆTEL, Conch. Sam., III, 1890, p. 172.
**Margaron* (*Unio*) *zelebori* LEA, Syn., 1870, p. 52.

New Zealand.

DIPLODON FLYENSIS Tapperone Canefri.

**Unio flyensis* TAPPERONE CANEFRI, Ann. Mus. Genov., XIX, 1883, p. 293, fig. 1.—*PÆTEL, Conch. Sam., III, 1890, p. 153.

Fly River, New Guinea.

†DIPLODON VITTATUS Lea.

**Unio vittatus* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 153; *Jl. Ac. N. Sci. Phila., IV, 1860, p. 249, pl. XXXVIII, fig. 128; *Obs., VII, 1860, p. 67, pl. XXXVIII, fig. 128.—*REEVE, Conch. Icon., XVI, 1864, pl. XXIII, fig. 83.—*PÆTEL, Conch. Sam., III, 1890, p. 171.
**Margaron* (*Unio*) *vittatus* LEA, Syn., 1870, p. 35.

Australia.

†DIPLODON LESSONI Kuster.

**Unio lessoni* KUSTER, Conch. Cab., 1856, p. 135, pl. XXXVI, fig. 4.—*PÆTEL, Conch. Sam., III, 1890, p. 157.
**Unio australis* KUSTER, Conch. Cab., 1861, p. 230, pl. LXXVII, fig. 6.

New South Wales.

†DIPLODON AUSTRALIS (Lamarck) Hanley.[2]

*?*Unio australis* LAMARCK, An. sans. Vert., VI, 1819, p. 80.—*?DESHAYES, Enc. Méth., II, 1830, p. 582.—*HANLEY, Test. Moll., 1842, p. 192; *Biv. Shells, 1843, p. 192, pl. XXI, fig. 25.—*CATLOW and REEVE, Conch. Nom., 1845, p. 56.—*PHILIPPI, Conch., III, 1848, p. 81, pl. V, fig. 5.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—*PÆTEL, Conch. Sam., III, 1890, p. 145.

[1] Suter thinks this is a variety of *menziezi*, but Colenso states that the posterior slope is keeled. If this is so, it must be quite different from that species.

[2] Lamarck's description of this species is wholly inadequate, and would apply about equally well to several species. He refers to no figure, and Lea states that he did not see the type. I credit the species to Hanley, whose figure seems to represent a form of an abundant and variable species commonly referred to Lamarck.

**Margarita* (*Unio*) *australis* LEA, Syn., 1836, p. 25; 1838, p. 19.
**Hyridella australis* SWAINSON, Tr. on Mal., 1840, p. 285.
**Margaron* (*Unio*) *australis* LEA, Syn., 1852, p. 28; 1870, p. 44.
*?*Unio depressus* LESSON, Voy. Coquille, 1830, II, p. 427, pl. XV, fig. 5.
**Margarita* (*Unio*) *depressus* LEA, Syn., 1836, p. 32; 1838, p. 22.
**Margaron* (*Unio*) *depressus* LEA, Syn., 1852, p. 33; 1870, p. 54.
**Unio ambiguus* PHILIPPI, Conch., III, 1847, p. 47, pl. III, fig. 2.[1]—* SOWERBY, Conch. Icon., XVI, 1868, pl. LXIX, fig. 355.—* P.ETEL, Conch. Sam., III, 1890, p. 144.
**Unio shuttleworthi* KUSTER, Conch. Cab. Unio, 1856, p. 152, pl. XLIV, fig. 2.
**Unio philippianus* KUSTER, Conch. Cab. Unio, 1861, p. 235, pl. LXXIX, fig. 2.
**Unio balonnensis* CONRAD, Pr. Ac. N. Sci. Phila., V, 1850, p. 10; * Jl. Ac. N. Sci. Phila., II, 1854, p. 295, pl. XXVI, fig. 3.
*?*Unio daniellii* VILLA, Jl. de Conch., XIX, 1871, p. 328.—* SMITH, Jl. Linn. Soc., XVI, 1882, p. 307.—* ? P.ETEL, Conch. Sam., III, 1890, p. 150.
Unio bednalli TATE. Where?[2]

†DIPLODON AUSTRALIS var. LEGRANDI Petterd.

**Unio depressus* REEVE, Conch. Icon., XVI, 1864, pl. XVIII, fig. 81.
**Unio legrandi* PETTERD, Pr. R. Soc. Tasm., 1887, p. 22; 1888, p. 81.

Australia; Tasmania.

†DIPLODON JEFFREYSIANUS Lea.

**Unio jeffreysianus* LEA, Pr. Ac. N. Sci. Phila., I, 1871, p. 188; *Jl. Ac. N. Sci. Phila., VIII, 1874, p. 23, pl. VII, fig. 20; *Obs., XIII, 1874, p. 27, pl. VII, fig. 20.

Australia.

†DIPLODON PROFUGUS Gould.

**Unio profugus* GOULD, Pr. Bost. Soc. N. H., 1850, p. 295;[3] * U. S. Expl. Exp., XII, 1852, p. 429, figs. 543, 543*a*, 543*b*.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 494.—* GOULD, Otia Conch., 1862, p. 88.
**Margaron* (*Unio*) *profugus* LEA, Syn., 1852, p. 29.

Hunter's River, New South Wales.

DIPLODON MORETONICUS Reeve.

**Unio moretonicus* REEVE, Conch. Icon., XVI, 1865, pl. XXIV, fig. 118.—* P.ETEL, Conch. Sam., III, 1890, p. 160.
**Margaron* (*Unio*) *mortonicus* LEA, Syn., 1870, p. 43.

Tasmania.

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[1] Credited to Parreyss *in litt.*

[2] Specimens received from Mr. Bednall bearing the above name are undoubtedly a form of *D. australis*. I do not know whether it has been described or not.

[3] The types are in the U. S. National Museum collection. Lea believes it to be the same as the *australis*. I am inclined to think it distinct.

†DIPLODON CULTELLIFORMIS Conrad.[1]

*†? *Unio depressa* LAMARCK, An. sans. Vert., VII, 1819, p. 79.—*? DELESSERT, Rec. Coq. Lam., 1841, pl. XII, fig. 5.—*CHENU, Ill. Conch., 1858, pl. XII, figs. 4, 4*a*.

**Unio depressus* HANLEY, Test. Moll., 1842, p. 200; *Biv. Shells, 1843, p. 200.—*CATLOW and REEVE, Conch. Nom., 1845, p. 58.—*CONRAD, Jl. Ac. N. Sci. Phila., 1854, p. 295, pl. XXXVI, fig. 2.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—*PÆTEL, Conch. Sam., III, 1890, p. 150.

**Unio cultelliformis* CONRAD, Pr. Ac. N. Sci. Phila., V, 1850, p. 10.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—*PÆTEL, Conch. Sam., III, 1890, p. 149.

**Margaron* (*Unio*) *cultelliformis* LEA, Syn., 1852, p. 32; 1870, p. 52.

*† *Unio paramatensis* LEA, Pr. Ac. N. Sci. Phila., VI, 1862, p. 176; *Jl. Ac. N. Sci. Phila., VI, 1866, p. 60, pl. XX, fig. 59; *Obs., XI, 1867, p. 64, pl. XX, fig. 59.

**Margaron* (*Unio*) *paramattensis* LEA, Syn., 1870, p. 35.

Australia.

†DIPLODON LUTULENTUS Gould.

**Unio lutulentus* GOULD, Pr. Bost. Soc. N. Hist., III, 1850, p. 295; *U. S. Expl. Exp., XII, 1852, p. 428, figs. 542, 542*a*, 542*b*, 542*c*.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 493.—*GOULD, Otia Conch., 1862, p. 88.—*REEVE, Conch. Icon., XVI, 1865, pl. XXV, fig. 122.—*HUTTON, N. Z. Moll., 1880, p. 161.—*PÆTEL, Conch. Sam., III, 1890, p. 158.

**Margaron* (*Unio*) *lutulentus* LEA, Syn., 1852, p. 32; 1870, p. 52.

New Zealand.

†DIPLODON WILSONII Lea.

**Unio wilsonii* LEA, Pr. Ac. N. Sci. Phila., 1859, p. 153; *Jl. Ac. N. Sci. Phila., IV, 1860, p. 257, pl. XL, fig. 137; *Obs., VII, p. 74, pl. XL, fig. 137.—*SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXVIII, fig. 474.—*PÆTEL, Conch. Sam., III, 1890, p. 172.

**Margaron* (*Unio*) *wilsonii* LEA, Syn., 1870, p. 47.

*† *Unio* (*Alasmodon*) *stuarti* ADAMS and ANGAS, Pr. Zool. Soc. Lond., 1863, p. 417.[2]

* *Unio stuarti* SOWERBY, Conch. Icon., XVI, 1866, pl. LIV, fig. 279.

**Anodon stuarti* SOWERBY, Conch. Icon., XVII, 1867, pl. XXXIV, figs. 136, 136*a*, 136*b*.

**Margaron* (*Unio*) *stuarti* LEA, Syn., 1870, p. 52.

**Margaritana stuarti* PÆTEL, Conch. Sam., III, 1890, p. 174.

**Anodonta stuarti* PÆTEL, Conch. Sam., III, 1890, p. 185.

Australia.

†DIPLODON EVANSI Adams and Angas.

**Unio* (*Alasmodon*) *evansi* ADAMS and ANGAS, Pr. Zool. Soc. Lond., 1864, p. 39.

**Unio evansi* SOWERBY, Conch. Icon., XVI, 1867, pl. LVI, fig. 285.—*PÆTEL, Conch. Sam., III, 1890, p. 152.

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[1] I can not identify Lamarck's *Unio depressus* with any certainty from his very meager description. Lea believed it to equal the form I have considered as *australis*, but Lamarck's description seems to apply to a more elongated species. Delessert's figure in 1841 probably equals Lea's *paramattensis*. As the name *depressus* was used for a *Unio* in 1801 by Donovan I am obliged to use another for this.

[2] A specimen of this in the Lea collection from the Stuart expedition is identical with Lea's species.

* *Margaron* (*Unio*) *evansi* LEA, Syn., 1870, p. 56.
* *Margaritana evansi* PÆTEL, Conch. Sam., III, 1890, p. 173.

Murray River, Australia

Section CUCUMERIA Conrad, 1853.

(Type, *Unio novæ-hollandiæ* Gray.)

Shell elongated, trapezoidal, widest behind; pseudocardinals irregular, small, not well developed, showing a tendency to break into denticles; laterals feeble; pallial line strongly pitted; nacre much thicker in front.

(Group of *Diplodon novæ-hollandiæ*.)

Shell having the posterior two-thirds covered with irregular nodules, which radiate somewhat from the posterior ridge.

†DIPLODON NOVÆ-HOLLANDIÆ Gray.

* *Unio novæ-hollandiæ* GRAY, Pr. Zool. Soc. Lond., 1834, p. 57.—* MOLLER, Syn. Nov. Gen., 1836, p. 197.—* HANLEY, Test. Moll., 1842, p. 182; * Biv. Shells, 1843, p. 182.—* CATLOW and REEVE, Conch. Nom., 1845, p. 61.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 496.—* PÆTEL, Conch. Sam., III, 1890, p. 161.
* *Margarita* (*Unio*) *novæ-hollandiæ* LEA, Syn., 1836, p. 17; 1838, p. 16.
* *Margaron* (*Unio*) *novæ-hollandiæ* LEA, Syn., 1852, p. 23; 1870, p. 35.
* † *Unio cucumoides* LEA, Proc. Am. Phil. Soc., 1840, p. 285; * Tr. Am. Phil. Soc., VIII, 1842, p. 192, pl. VII, fig. 2; * Obs., III, 1842 p. 30, pl. VII, fig. 2.—* HANLEY, Biv. Shells, Sup., 1856, p. 382, pl. XXIV, fig. 4.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 497.—* CHENU, Ill. Conch., 1858, pl. XXVII, figs. 3, 3*a*, 3*b*.—* KUSTER, Conch. Cab. Unio, 1861, p. 219, pl. LXXIV, fig. 1.—* REEVE, Conch. Icon., XVI, 1865, pl. XIX, fig. 89.—* PÆTEL, Conch. Sam., III, 1890, p. 149.
* *Margaron* (*Unio*) *cucumoides* LEA, Syn., 1852, p. 21; 1870, p. 31.
* ? *Unio cumingianus* DUNKER, Zeits. für Mal., 1853, p. 53.

Australia.

(Group of *Diplodon shuttleworthii*.)

Beak sculpture consisting of strong, irregularly radiate, curved, nodulous bars; surface of shell somewhat sulcate, but not nodulous.

†DIPLODON SHUTTLEWORTHII Lea.

* *Unio shuttleworthii* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 94; * Jl. Ac. N. Sci. Phila., III, 1857, p. 304, pl. XXVIII, fig. 19; VI, 1857, p. 24, pl. XXVIII, fig. 19.—* SOWERBY, Conch. Icon., XVI, 1866, pl. XXXII, fig. 167.
* *Margaron* (*Unio*) *shuttleworthii* LEA, Syn., 1870, p. 36.
* ? *Unio mutabilis* REEVE, Conch. Icon., XVI, 1865, pl. XXIV, fig. 112.
* *Unio angasi* SOWERBY, Conch. Icon., XVI, 1867, pl. LV, fig. 282.
* *Margaritana angasi* PÆTEL, Conch. Sam., III, 1890, p. 172.
* *Anodonta angasi* PÆTEL, Conch. Sam., III, 1890, p. 176.

Australia.

† DIPLODON MUTABILIS Lea.

* *Unio mutabilis* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 152; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 248, pl. XXXVII, fig. 127; * Obs., VII, 1860, p. 66, pl. XXXVIII, fig. 127.—* PÆTEL, Conch. Sam., III, 1890, p. 160.
* *Margaron* (*Unio*) *mutabilis* LEA, Syn., 1870, p. 53.

Murray River, Australia.

Subgenus LÆVIROSTRIS Simpson, 1900.

(Type, *Unio stagnorum* Dautzenberg.)

Shell irregularly quadrate, thin, inequilateral, compressed, rounded and narrowed in front, somewhat biangulate and truncate behind; beaks rather low, without sculpture;[1] surface finely concentrically grooved; epidermis delicately lamellated and serrate; pseudocardinals small; laterals elongated; anterior muscle impressions small, well marked; posterior scars superficial; nacre bluish-white.

Animal unknown.

DIPLODON STAGNORUM Dautzenberg.

* *Unio stagnorum* DAUTZENBERG, Bull. Acad. Belg., XX, 1890, p. 372, pl. 1, figs. 7, 10.

Kongo River, Africa.

The following are unfigured and uncertain species.

* *Unio depressa* D'ORBIGNY, Guer. Mag., 1835, p. 34.[2]
* *Unio fokkesi* DUNKER, Zeits. für Mal., IX, 1853, p. 54.

Rio de la Plata, Brazil. According to von Ihering, this = *U. wheatleyanus* Lea.

* *Unio koseretzi* CLESSIN, Mal. Bl., X, p. 172.

River Guahyba, Brazil.

* *Unio macropterus* DUNKER, Zeits. für Mal., III, 1846, p. 109.

Brazil.

* *Unio paraguanus* VON MARTENS, S. B. Ges. Nat. Fr., 1895, p.
* *Unio zealandicus* PÆTEL, C. Sam., III, 1890, p. 172. Said to be of Gray. Where?
Unio damnoica D'ORBIGNY. Where?
Unio guahybæ VON IHERING.
Unio æthiopiformis VON IHERING.
Unio bishoffi VON IHERING.
Unio sebastanæ VON IHERING.
Unio iheringi VON CLESSIN.

[1] According to Dautzenberg the beaks of the remarkable species on which I have founded the above subgenus are completely smooth. It has the appearance of a *Diplodon* in all other respects, according to the figures and description. Dautzenberg does not very carefully describe the teeth.

[2] According to d'Orbigny (Voy. Am. Mer., p. 611), this species, which he says is the *depressa* of Lamarck, is found in Chile, near Valparaiso. It can not be Lamarck's species.

I do not know where the last five species are described, and they probably have never been published. Wright has named a Texan species *Unio iheringi*.

Family MUTELIDÆ.

Shell usually without sculpture throughout; beaks smooth or but faintly corrugated, never exhibiting the remains of an embryonic shell; with or without teeth, which, when present, are irregularly taxodont, the shell showing vestiges of them in all the genera; nacre soft, richly tinted, generally surrounded with a wide, prismatic border; escutcheon large, distinct; palleal line usually simple, but sometimes having a slight sinus posteriorly.

Animal having the labial palpi large, rounded below, generally without free points, scarcely or not at all united posteriorly; anal and superanal openings not separated; mantle generally closed behind into branchial and anal siphons, which are always separated by a strong bridge; marsupium occupying the inner gills; embryo a lasidium, composed of three segments, the anterior head-like, the median bearing a single shell, the posterior tail-like.

Genus SPATHA Lea, 1838.

(Type, *Anodonta rubens* Lamarck.)

Spatha LEA, Tr. Am. Phil. Soc., VI, 1858, p. 141, footnote.

Shell elliptical; beaks very slightly or not at all sculptured; left valve having a faint, compressed tooth under and in front of the beak, which fits into a corresponding depression in the right valve; the entire hinge area often covered with longitudinally folded epidermal matter; escutcheon dark, sharply triangular; beak cavities shallow, with a single, elongate, deep scar in each; two large anterior muscle scars and two posterior ones, the upper small.

Animal having the palpi longer than wide, semicircular, attached along the upper edge, not united; mantle margin united behind so that the branchial and anal apertures are closed; on the under margin the mantle is entirely open; outer branchiæ united to the mantle to their extremity; inner the larger, free from the abdominal sack; foot tongue shaped, thick; anal and branchial openings separated by a strong bridge. *S. rubens* Lamarck (Troschel).

Subgenus SPATHA Lea, 1838.

(Type, *Spatha rubens* Lamarck.)

Shell solid, having faint concentric beak sculpture.

(Group of *Spatha rubens*.)

Sculpture of the beaks following the growth lines; shell solid.

†SPATHA RUBENS Lamarck.

* *Anodonta rubens* LAMARCK, An. sans. Vert., VI, 1819, p. 85.—* BLAINVILLE, Man., 1825, p. 538.—* CAILLIAUD, Voy. à Méroé, IV, p. 262; Atlas, II, 1826, pl. IX, fig. 12.—*AUDOUIN, Savigny's Exp. de l'Egypte, Coquilles, 1827, pl. VII.[1]—* DESHAYES, Enc. Meth., II, 1827, p. 147, pl. CCI, figs. 1, 1*b*.

* *Iridina rubens* RANG, Nouv. Ann. Mus., 1885, p. 314.—* LEA, Syn., 1836, p. 56.—* HANLEY, Biv. Shells, 1843, p. 225.—* CATLOW and REEVE, Conch. Nom., 1845, p. 68.—* MORELET, Moll. Terr. et Fluv., 1868, p. 98.

* *Platiris* (*Spatha*) *rubens* LEA, Syn., 1838, p. 33; 1852, p. 55; 1870, p. 89.

* *Spatha rubens* CLESSIN, Conch. Cab. Ano., 1853, p. 185, pl. VII, fig. 1; 1876, pl. LXI, fig. 1.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 507, pl. CXIX; III, figs. 3, 3*a*.—* CHENU, Man., 1859, II, p. 148, fig. 729.—* PÆTEL, Conch. Sam., III, 1890, p. 188.

* *Anodon rubens* SOWERBY, Conch. Icon., XVII, 1867, pl. II, fig. 5.

Anodonta clappertoni KŒNIG, Duchane and Clapperton's Travels, 1826, p.

Anodonta splendens DE CRISTOFORI, Crist. and Jan. Cat., 1832 (†), p.

* *Iridina solida* ANTON, Verz. der Conch., 1839, p. 16.

* *Anodonta solida* KUSTER, Conch. Cab. Ano., 1853, p. 50, pl. XII, fig. 1.

* *Spatha wissmani* VON MARTENS, S. B. Nat. Fr., 1883, p. 73; Conch. Mitth., III, 1885 (†), p. 139, pl. XXVII.

* *Spatha rotundata* VON MARTENS, Besch., 1897, p. 242, fig. *d*.[2]

†SPATHA RUBENS var. CAILLIAUDI von Martens.

* *Anodonta rubens* AUDOUIN in SAVIGNY, Icon. Moll. Eg., 1827, pl. VII, fig. 1.

* *Spatha cailliaudi* VON MARTENS, Mal. Bl., XIII, 1866, p. 9.—* JICKELI, L. and S. W. Moll., 1874, p. 259, pl. VIII, fig. 1.—* KOBELT, Icon., new ed., II, 1886, p. 27, pl. XLVI, fig. 267.—* WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 314.—* PÆTEL, Conch. Sam., III, 1890, p. 188.

* *Spatha bellamyi* JOUSSEAUME, Bull. Soc. Zool. Fr., XI, 1886, p. 491, pl. XIII, figs. 2, 2*a*.

* *Spatha renei* JOUSSEAUME, Bull. Soc. Zool. Fr., XI, 1886, p. 492, pl. XIII, figs. 3, 3*a*.

Nile; Niger; Senegal; other points in West Africa.

†SPATHA LEPSII Jickeli.

* *Spatha lepsii* JICKELI, Faun. L. and S. W. Moll, 1874, p. 265, pl. IX, fig. 4.—* PÆTEL, Conch, Sam., III, 1890, p. 188.

Upper Egypt: Senegal.

†SPATHA CHAIZIANA Rang.

* *Anodonta chaiziana* RANG, Mem. Aceph Senegal, (Nouv. Ann. Mus.), 1835, p. 13, pl. XXVIII.[3]—* MORELET, Moll. Terr. and Fluv., 1868, p. 97.

[1] Savigny's plates were issued without explanation in 1813. In 1827 Audouin published an explanation of them. Von Martens believes this is not the *Spatha rubens* of the Encyc. Méth. (Mal. Bl., 1866). This species is widespread, abundant, and variable, and the material I have examined leads me to believe that it may include either the short, rounded form of the Encyc. Méth. or specimens that are more elongated and even somewhat rhomboid.

[2] I can not see any essential difference between this and forms of what I believe are *S. rubens*. I believe that the *S. cailliaudi* is only one of these forms.

[3] I have only seen the reprint of this paper, which begins with page 1.

* *Margarita* (*Anodonta*) *chaiziana* LEA, Syn., 1838, p. 30.
* *Anodon chaiziana* CATLOW and REEVE, Conch. Nom., 1845, p. 66.
* *Margaron* (*Anodonta*) *chaiziana* LEA, Syn., 1852, p. 49; 1870, p. 79.
* *Spatha chaiziana* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 507.—* CLESSIN, Conch. Cab. Ano., 1876, p. 187, pl. LXIII, figs. 3, 4.—* PÆTEL, Conch. Sam., III, 1890, p. 188.

Senegal; Niger; Upper Nile; West Africa.

† SPATHA TRISTIS Jousseaume.

* *Spatha tristis* JOUSSEAUME, Bull. Soc. Zool. Fr., XI, 1886, p. 497.[1]
* *Spatha rochebrunei* JOUSSEAUME, Bull. Soc. Zool. Fr., XI, 1886, p. 494, pl. XIV, figs. 1, 1*a*.

Upper Senegal.

SPATHA TRAPEZIA von Martens.

* *Spatha trapezia* VON MARTENS, Besch., 1897, p. 243, fig.

SPATHA TRAPEZIA var. SENILIS von Martens.

* *Spatha trapezia* var. *senilis* VON MARTENS, Besch., 1897, p. 244.

Lake Victoria Nyanza.

SPATHA DROUETI Chaper.

* *Spatha droueti* CHAPER, Bull. Soc. Zool. de Fr., X, 1885, p. 2, pl. 1, figs. 1-3.[2]—* PÆTEL, Conch. Sam., III, 1890, p. 188.

Assinie, Africa.

SPATHA MARTENSI STURANY.

Spatha martensi STURANY in Baumann, Durch Massai, 1894, p. 12, pl. XXV, fig. 39.—VON MARTENS, Besch., 1897, p. 244.

Stream falling into Lake Victoria Nyanza. I have not seen Sturany's paper.

SPATHA KIRKI Ancey.

* *Spathella Kirki* ANCEY, Bull. Soc. Zool. Fr., VII, 1894, p. 229, figs. 4-6.—* VON MARTENS, Besch., 1897, p. 244, fig.[3]

SPATHA KIRKI var. LIEDERI von Martens.

* *Spatha kirki* var. *liederi* VON MARTENS, Besch., 1897, p. 245.

Shire River and Lake Nyanza.

SPATHA MABILLEI Jousseaume.

* *Spatha mabillei* JOUSSEAUME, Bull. Soc. Zool. de Fr., XI, 1886, p. 495, pl. XIV, figs. 2, 2*a*.

Senegal River.

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[1] Morelet believes this to=*chaiziana*. An author's shell is in the U. S. National Museum, and I am inclined to believe it to be a valid species.

[2] Only inside and dorsal views, and I can not be sure whether it is a good species or not.

[3] This species seems to me to be very close to *S. trapezia* von Martens.

SPATHA ADANSONI Jousseaume.

* *Spathella adansoni* JOUSSEAUME, Bull. Soc. Zool. Fr., XI, 1886, p. 498, pl. XIV, figs. 4, 4*a*.

High Senegal.

†SPATHA WAHLBERGI Krauss.

* *Iridina wahlbergi* KRAUSS, Sud Af. Moll., 1848, p. 19, pl. II, fig. 1.
* *Platiris* (*Spatha*) *wahlbergi* LEA, Syn., 1852, p. 55; 1870, p. 89.
* *Spatha wahlbergi* H. and A. ADAMS, Gen. Rec. Moll, II, 1857, p. 507.—* VON MARTENS, Mal. Bl., VI, 1860, p. 217.—* CLESSIN, Conch. Cab. Ano., 1876, p. 187, pl. LXIII, fig. 1.—* PÆTEL, Conch. Sam., III, 1890, p. 188.—* VON MARTENS, Besch., 1897, p. 247.
* *Mutela wahlbergi* SMITH, Ann. and Mag., VIII, 1891, p. 319.
*† *Spatha natalensis* LEA, Pr. Ac. N. Sci. Phila., VIII, 1864, p. 113; * Jl. Ac. N. Sci. Phila., VI, 1866, p. 64, pl. XX, fig. 58; * Obs., XI, 1867, p. 68, pl. XX, fig. 58.—* CLESSIN, Conch. Cab. Ano., 1876, p. 189, pl. LXII, figs. 7, 8.
* *Platiris* (*Spatha*) *natalensis* LEA, Syn., 1870, p. 89.
* *Spatha hartmanni* VON MARTENS, Mal. Bl., XIII, 1866, p. 10.—* JICKELI, Faun., 1874, p. 263, pl. VIII, fig. 2.—* CLESSIN, Conch. Cab. Ano., 1875, p. 190, pl. LXI, figs. 2, 3.—* PÆTEL, Conch. Sam., III, 1890, p. 188.
* *Anodon tabula* SOWERBY, Conch. Icon., XVII, 1867, pl. XVIII, fig. 68.
* *Anodonta tabula* PÆTEL, Conch. Sam., III, 1890, p. 185.

SPATHA WAHLBERGI var BOURGNIGNATI Bourgnignat.

* *Spatha bourgnignati* BOURGNIGNAT, Esp. Onk. et Tan., 1885, p. 12.
* *Spathella bourgnignati* BOURGNIGNAT, Moll. Af. Eq., 1889, p. 197, pl. VIII, fig. 1.
* *Spathella spathuliformis* BOURGNIGNAT, Moll. Af. Eq., 1889, p. 199, fig.
* *Spatha wahlbergi spatuliformis* VON MARTENS, Beschalte, 1897, p. 248, pl. VII, fig. 18.
* *Spathella bloyeti* BOURGNIGNAT, Moll. Af. Eq., 1889, p. 198, pl. VIII, fig. 3.
* *Spatha bloyeti* VON MARTENS, Besch., 1897, p. 249.

Tropical and southern Africa. The variety is reported from Lake Nyassa.

SPATHA LACUSTRIS Simpson.[1]

* *Spatha anceyi* BOURGNIGNAT, Bull. Soc. Zool. Fr., VII, 1894, p. 231, fig. 7.—* VON MARTENS, Besch., 1897, p. 247.

Lake Nyassa.

†SPATHA NYASSAENSIS Lea.

* *Spatha nyassaensis* LEA, Pr. Ac. N. Sci. Phila., VIII, 1864, p. 109; * Jl. Ac. N. Sci. Phila., VI, 1866, p. 36, pl. XIII, fig. 33; * Obs., XI, 1867, p. 40, pl. XIII, fig. 33.—* ?CLESSIN, Conch. Cab. Ano., 1876, p. 190, pl. LXII, figs. 3, 4.—* PÆTEL, Conch. Sam., III, 1890, p. 188.—* VON MARTENS, Besch., 1897, p. 246.
* *Platiris* (*Spatha*) *nyassaensis* LEA, Syn., 1870, p. 89.
* *Spathella nyassaensis* ANCEY, Bull. Soc. Zool. Fr., VI, 1894, p. 228.
* *Spatha nyassana* BOURGNIGNAT, Bull. Soc. Mal. Fr., VI, 1889, p. 38.

[1] Changed from *S. anceyi*, as there is another species with that name.

SPATHA MARNOI Jickeli.

* *Spatha marnoi* JICKELI, L. and Suss. Moll. N. Ost-Af., 1874, p. 259, pl. VIII, fig. 3.—* PÆTEL, Conch. Sam., III, 1890, p. 188.

Abyssinia.

SPATHA SUBÆQUILATERA von Martens.

* *Spatha subæquilatera* VON MARTENS, Conch. Mitt., III, 1887, p. 18, pl. XLI, figs. 8, 9; * Besch., 1897, p. 246, pl. VII, fig. 16.

Spatha baumanni STURANY in Baumann, Durch. Massai., 1894, p. 12, pl. XXV, fig. 38.

Lake Victoria Nyanza.

SPATHA SINUATA von Martens.

* *Spatha sinuata* VON MARTENS, S. B. Nat. Fr., 1883, p. 173; Conch. Mitt., II, 1885, p. 190, pl. XXXIV, figs. 5, 6.

Congo.

(Group of *Spatha petersi*.)

Shell rather thin and small, greenish or olive; beak sculpture consisting of faint, more or less oblique, parallel ridges; hinge line narrow; teeth scarcely developed; nacre bluish or greenish. Animal unknown.

† SPATHA PETERSI von Martens.

* *Spatha petersi* VON MARTENS, Mal. Bl., VI, 1860, p. 218, pl. III, figs. 1, 2.—* DOHRN, Pr. Zool. Soc. Lond., 1864, p. 117.—* VON MARTENS, Besch., 1897, p. 251.

* *Mutela petersi* CLESSIN, Conch. Cab. Ano., 1875, p. 197, pl. LXII, figs. 1, 2.—* PÆTEL, Conch. Sam., III, 1890, p. 187.—* SMITH, Pr. Mal. Soc. Lond., 1894, p. 167.

Spathella petersi BOURGUIGNAT, Mol. Af. Eq., 1889, p. 197.

* † *Spatha modesta* LEA, Pr. Ac. N. Sci. Phila., VIII, 1864, p. 109; * Jl. Ac. N. Sci. Phila., VI, 1866, p. 37, pl. XIII, fig. 35; * Obs., XI, 1867, p. 41, pl. XIII, fig. 35.

* *Platiris* (*Spatha*) *modesta* LEA, Syn., 1870, p. 89.

Mozambique; Zanzibar and Uganda.

† SPATHA ARCUATA Cailliaud.

* *Anodonta arcuata* CAILLIAUD,[1] Voy. à Méroé, IV, 1826, p. 263; II, pl. LX, figs. 4, 5.—* CATLOW and REEVE, Conch. Nom., 1845, p. 66.—* H. and A. ADAMS, Gen., Rec. Moll., II, 1857, p. 503.—* VON MARTENS, Mal. Bl., XIII, 1866, p. 77.—* ?CLESSIN, Conch. Cab. Ano., 1874, p. 145, pl. XLVII, figs. 1, 2.—* JICKELI, L. and Suss. Moll. N. Ost-Af. 1874, p. 265.—* PÆTEL, Conch. Sam., III, 1890, p. 176.

* *Margarita* (*Anodonta*) *arcuata* LEA, Syn., 1836, p. 54; 1838, p. 32.

* *Iridina arcuata* POTIEZ and MICHAUD, Gall. Moll., 1844, p. 146, pl. LV, fig. 4.

* *Margaron* (*Anodonta*) *arcuata* LEA, Syn., 1852, p. 53; 1870, p. 83.

* *Spatha arcuata* JICKELI, Faun., 1874, p. 265.—* PÆTEL, Conch. Sam., III, 1890, p. 188.

Egypt; Abyssinia.

[1] *Arcuta* in The Voyage; a typographical error, I presume.

SPATHA CRYPTORADIATA Putzeys.

* *Spatha cryptoradiata* PUTZEYS, Proc. Verb. Soc. Mal. Belg., 1898, pl. XXVII, figs. 14, 15.

Leopoldville; Congo.

SPATHA STUHLMANNI von Martens.

* *Spatha stuhlmanni* VON MARTENS, Besch., 1897, p. 250, fig.[1]

Lake Albert; Nyanza.

SPATHA SUBRENIFORMIS Sowerby.

* *Anodon solceniformis* SOWERBY, Conch. Icon., XVII, 1867, pl. XIV, fig. 50.
* *Anodonta subreniformis* PÆTEL, Conch. Sam., III, 1890, p. 185.

Lake Nyanza.

SPATHA PFEIFFERIANA Bernardi.

* *Margaritana pfeifferiana* BERNARDI, Jl. de Conch., IV, 1860, p. 331, pl. XII, figs. 1, 2.—PÆTEL, Conch. Sam., III, 1890, p. 173.
* *Margaron* (*Margaritana*) *pfeifferiana* LEA, Syn., 1870, p. 68.

Gaboon; West Africa.

†SPATHA DAHOMEYENSIS Lea.

* *Anodonta dahomeyensis* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 154; * Jl. Ac. N. Sci. Phila., IV, 1859, p. 261, pl. XLI, fig. 141; * Obs., VII, 1860, p. 79, pl. XLI, fig. 141.—* PÆTEL, Conch. Sam., III, 1890, p. 178.—* CLESSIN, Conch. Cab. Ano., 1873, p. 103, pl. XXXI, figs. 5, 6.
* *Anodon dahomeyensis* SOWERBY, Conch. Icon., XVII, 1870, pl. XXXVI, fig. 151.
* *Margaron* (*Anodonta*) *dahomeyensis* LEA, Syn., 1870, p. 82.
* † *Anodonta senegalensis* LEA, Pr. Ac. N. Sci. Phila., III, 1859, p. 154; * Jl. Ac. N. Sci. Phila., IV, 1860, p. 260, pl. XLI, fig. 140; * Obs., VII, 1860, p. 78, pl. XLI, fig. 140.—* CLESSIN, Conch. Cab. Ano., 1873, pl. XXXI, figs. 7, 8.—* PÆTEL, Conch. Sam., III, 1890, p. 184.
* *Anodon senegalensis* SOWERBY, Conch. Icon., XVII, 1867, pl. XI, fig. 35; 1870, pl. XXXIII, fig. 130.
* *Margaron* (*Anodonta*) *senegalensis* LEA, Syn., 1870, p. 82.
* *Spatha senegalensis* PÆTEL, Conch. Sam., III. 1890, p. 188.
* *Mutelina senegalica* JOUSSEAUME, Bull. Soc. Zool. de Fr., XI, 1886, p. 488.[2]

West Africa.

SPATHA COMPLANATA Jousseaume.

* *Mutelina complanata* JOUSSEAUME, Bull. Soc. Zool. de Fr., XI, 1886, p. 489, pl. XIII, figs. 1, 1*a*.

Upper Senegal; Niger River.

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[1] I am doubtful whether this is distinct from *S. arcuata*.

[2] Jousseaume has the unspeakable assurance to take the *Anodonta senegalensis* of Lea, place it in the so-called genus *Mutelina*, change the specific name to *senegalica*, and credit the whole to Bourguignat.

SPATHA DIVARICATA von Martens.

* *Spatha divaricata* VON MARTENS, Besch., 1897, p. 250, pl. VII, fig. 15.

Lake Victoria; Nyanza.

Subgenus MONCETIA Bourguignat, 1885.

(Type, *Moncetia anceyi* Bourguignat.)

Shell long-elliptical, inequilateral, compressed, thick, somber-colored; beaks compressed, smooth, sharp; hinge with a tubercular eminence near the beak of the right valve, with two internal ligaments and three groups of muscular impressions (Bourguignat).[1]

Animal unknown.

SPATHA ANCEYI Bourguignat.

* *Moncetia anceyi* BOURGUIGNAT, Esp. Ouk., 1885, p. 34; * Icon. Mal., 1888, pl. XXX, fig. 1.—* VON MARTENS, Besch., 1897, p. 258.

* *Moncetia jouberti* BOURGUIGNAT Un. et Ir., 1886, p. 63; * Icon. Mal., 1888, pl. XXX, fig 4.

Lake Tanganyika.

SPATHA MONIETI Bourguignat.

* *Moncetia monieti* BOURGUIGNAT, Un. et Ir., 1886, p. 61; * Icon. Mal., 1888, pl. XXX, fig. 7.

* *Moncetia rochebruneana* BOURGUIGNAT, Nouv. Mal., 1886, p. 62; * Icon. Mal., 1888, pl. XXX, fig. 8.

Lake Tanganyika.

SPATHA LAVIGERINA Bourguignat.

* *Moncetia larigerina* BOURGUIGNAT, Nouv. Mal., 1886, p. 60; * Icon. Mal., 1888, pl. XXX, fig. 6.

* *Moncetia bridouxi* BOURGUIGNAT, Un. et Ir., 1886, p. 65; * Icon. Mal., 1888, pl. XXX, fig. 5.

Lake Tanganyika.

Subgenus ASPATHARIA Bourguignat, 1885.

(Type, *Margaritana vignoniana* Bernardi.)

Shell elongated rhomboid, somewhat compressed, with a full, rounded posterior ridge, from which curved rows of fine, broken corrugations radiate; epidermis dark olive ,wrinkled, rayless; beak sculpture not seen; hinge with a low, slightly elevated ridge in the left valve in front of the beak; dorsal scars small; nacre lurid, bluish-green. Animal unknown.

[1] This may be a distinct genus, though its characters seem to agree fairly well in most respects with those of *Spatha*. Bourguignat does not describe the muscle scars or tell anything of the nacre.

†SPATHA VIGNONIANA Bernardi.

* *Margaritana vignoniana* BERNARDI, Jl. de Conch., VII, 1858, p. 302, pl. x, fig. 1.—* PÆTEL, Conch. Sam., III, 1890, p. 174.
* *Unio vignoniana* REEVE, Conch. Icon., XVI, 1865, pl. XXV, fig. 120.
* *Anodonta vignonana* MUSGRAVE, Phot. Conch., 1863, pl. I, fig. 1.
* *Anodon vignonanus* REEVE, Conch. Icon., XVII, 1870, pl. XXIX, fig. 116.
* *Margaron (Unio) vignonana* LEA, Syn., 1870, p. 32.
* *Margaron (Margaritana) vignonana* LEA, Syn., 1870, p. 67.
* ? *Anodonta rugifera* DUNKER, Mal. Bl., V, 1858, p. 225.[1]

Gaboon, West Africa.

SPATHA CORRUGATA Dautzenberg.

* *Spatha corrugata* DAUTZENBERG, Jl. de Conch., XLI, 1893, p. 50, pl. VIII, fig. 5.

River Niari, West Africa.

The following are unfigured and unidentified species.

* *Spatha pangallicensis* ROCHEBRUNE, Bull. Soc. Phil., VI, 1882, p. 33.

High Senegal.

* *Anodonta tawi* RANG., Nouv. Ann. Mus., 1834, p. 297.

Senegal.

* *Spatha baikii* H. ADAMS, Proc. Zool. Soc. Lond., 1866, p. 447.

Niger River.

* *Spatha anataria* JICKELI, Faun. Suss. Moll. N. O. Af., 1874, p. 266.

Egypt.

* *Spatha gancinensis* ROCHEBRUNE, Bull. Soc. Mal. Fr., III, 1886, p. 9.
* *Spatha corneola* ROCHEBRUNE, Bull. Soc. Mal. Fr., III, 1886, p. 9.
* *Spathella protchi* ROCHEBRUNE, Bull. Soc. Mal. Fr., III, 1886, p. 9.

Kongo River.

* *Chambardia* BOURGUIGNAT in Servain, 1891. New name for the Egyptian *Iridinidæ*.

Chambardia bourguignati, *C. locardiana*, *C. letourneuxiana*, *C. pharaonum*, *C. rhynchonella*, *C. rhynchoidéa*. Some of these are credited to Bourguignat and some to Servain. I don't know what they are. They may be Moncetias.

Genus MUTELA Scopoli, 1777.

(Type, *Iridina exotica* Lamarck.)

Mutela SCOPOLI, Intr. Nat. Hist., 1777, p. 397.
Iridina LAMARCK, An. sans Vert., VI, 1819, p. 88.
Calliscapha SWAINSON, Tr. on Mal., 1840, p. 380.
Eufira GISTEL, Naturg. Hohe Schul., 1848, p.

Shell elongated, slightly inflated, with low, smooth beaks, and a rounded posterior ridge; surface faintly concentrically grooved; epidermis rayless; hinge straight, having generally vestiges of taxodont teeth;

[1] Probably = *S. vignoniana* Bernardi, but there is only a Latin description. Both were published the same year.

dorsal scars an irregular row, extending downward and forward; muscle scars irregular.

Animal having the palpi longer than wide, not united; mantle margin united as far as the foot, so that the branchial and anal openings are closed; outer branchiæ united to the mantle to the extremity; inner entirely united to the foot; foot tongue shaped, somewhat produced anteriorly. *Iridina cælestis* Lea (Troschel.)

(Group of *Mutela exotica*.)

Shell elongate, rhomboid, wider and subtruncated behind, subsolid.

†MUTELA EXOTICA Lamarck.

* *Iridina exotica* LAMARCK, An. sans Vert., VI, 1819, p. 89; * Enc. Méth., II, 1827, p. 147, pl. CCIV, fig. 1, 1*b*; * STARK, Nat. Hist., II, 1828, p. 88.—* LEA, Syn., 1836, p. 56.—* HANLEY, Biv. Shells, 1843, p. 225.—* CATLOW and REEVE, Conch. Nom., 1845, p. 68.—* SOWERBY, Conch. Icon., XVI, 1868, pl. I, fig. 2.—* CLESSIN, Conch. Cab. Ano., 1875, p. 231, pl. LXXI, fig. 1.

* *Anodonta exotica* BLAINVILLE, Man., 1825, p. 538, pl. LXVI, fig. 3.

* *Platiris* (*Iridina*) *exotica* LEA, Syn., 1838, p. 33; 1852, p. 54; 1870, p. 88.

* *Pleiodon exoticus* P.ETEL, Conch. Sam., III, 1890, p. 188.

* *Iridina elongata* SOWERBY, Rec. and Fos. Shells, VII, 1821, fig. 1.[1]—* OKEN, Isis, 1834, p. 458.—* SOWERBY, Conch. Man., 1839, fig. 150.—* SWAINSON, Tr. on Mal., 1840, p. 286, fig. 60.—* REEVE, Conch. Syst., I, 1841, p. 122, pl. XCII.—* HANLEY, Biv. Shells, 1843, p. 225.—* CATLOW and REEVE, Conch. Nom., 1845, p. 68.—* SOWERBY, Conch. Icon., XVI, 1868, pl. I, fig. 1.

* *Platiris* (*Spatha*) *elongata* LEA, Syn., 1838, p. 34.

* *Mutela elongata* P.ETEL, Conch. Sam., III, 1890, p. 187.

* *Iridina striata* OKEN, Isis, 1834, p. 458.

* ? *Mutela soleniformis* BOURGUIGNAT, Esp. Ouk., 1885, p. 25.—* PELSENEER, Bull. Mus. Belg., IV, 1886, p. 109.—* BOURGUIGNAT, Icon. Mal., 1888, pl. XXII, fig. 2.—* VON MARTENS, Besch., 1897, p. 254.

* ? *Mutela bridouxi* BOURGUIGNAT, Un. et Ir., 1886, p. 25; * Icon. Mal., 1888, pl. XXII, fig. 1.

Tropical Africa.

†MUTELA DUBIA Gmelin.

Le Mutel ADANSON, Hist. Nat. du Sen., 1757, p. 234, pl. XVII, fig. 21.

* *Mytilus dubia* GMELIN, Syst. Nat., 1788, p. 3368.[2]

* *Anodonta dubia* BOSC, Hist Nat. Coq., III, 1824, p. 144.

* *Platiris* (*Spatha*) *dubia* LEA, Syn., 1852, p. 55; 1870, p. 89.

* *Mutela dubia* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 506, pl. CXIX; III, figs. 1, 1*a*.—* CLESSIN, Conch. Cab. Ano., 1873, p. 194, pl. XXV, fig. 3.—* P.ETEL, Conch. Sam., III, 1890, p. 187.

* *Iridina dubia* CHENU, Man., 1859, II, p. 147, fig. 726.

* *Mytilus dubius* DILLWYN, part, Cat., I, 1817, p. 318.—* WOOD, Ind. Test. rev., 1856, p. 69, pl. XII, fig. 36.

West Africa.

[1] I agree with Lea that this = *exotica*. The teeth are not strongly developed.

[2] Gmelin refers to Adanson's figure. Dillwyn evidently has Gmelin's species and *Cristaria plicata* from China confounded. Two or three of these so-called species of *Mutela* are very close, and large series from different localities would probably show that they run together. There is much variation in the form and the development of hinge tubercles, even in a single species from a given locality.

*MUTELA NILOTICA Sowerby.

Iridina nilotica* SOWERBY, Zool. Journal, I, 1835, p. 53, pl. II.—?CAILLIAUD*, Voy. à Méroé, 1826, pl. LX, fig. 12.—*AUDOUIN, SAVIGNY, Icon. Moll. Egypt, 1827, pl. VII, fig. 2.—*CROUCH, Ill. Int. Lam., 1827, p. 17, pl. X, fig. 1.—*LEA, Syn., 1836, p. 56.—*HANLEY, Biv. Shells, 1843, p. 225.—*CATLOW and REEVE, Conch. Nom., 1845, p. 68.—*DESHAYES, Tr. Ele., II, 1853, p. 219, pl. XVII, figs. 6, 7.—*CHENU, Man., 1859, II, p. 148, fig. 727.—*SOWERBY, Conch. Icon., XVI, 1868, pl. II, fig. 4.

**Platiris* (*Spatha*) *nilotica* LEA, Syn., 1838, p. 33.

**Mytilus niloticus* WOOD, Ind. Test. Rev., 1856, p. 207, pl. II, sup. fig. 1.

**Mutela nilotica* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 506.—*JICKELI, Faun., 1874, p. 259.—*PÆTEL, Conch. Sam., III, 1890, p. 187.—*WESTERLUND, Faun. Pal., II, Pt. 7, 1890, p. 313.

**?Mutela jouberti* BOURGUIGNAT, Un. et Ir., 1886, p. 28; *Icon. Mal., 1888, pl. XXIII, fig. 1.—*PÆTEL, Conch. Sam., III, 1890, p. 187.

**?Mutela visseri* BOURGUIGNAT, Un. et Ir., 1886, p. 31.—*PÆTEL, Conch. Sam., III, 1890, p. 187.

**Mutela vysseri* BOURGUIGNAT, Icon. Mal., 1888, pl. XXIII, fig. 3.

MUTELA NILOTICA var. EMINI von Martens.

**Mutela nilotica* var. *emini* VON MARTENS, Besch., 1897, p. 253.

Tropical Africa.

†MUTELA ANGUSTATA Sowerby.

**Iridina angustata* SOWERBY, Conch. Icon., XVI, 1868, pl. II, fig 5.

**Mutela angustata* JICKELI, Faun. N. O. Af., 1874, p. 268.—*PÆTEL, Conch. Sam., III, 1890, p. 187.—*WESTERLUND, Faun. Pal., II., pl. 7, 1890, p. 312.

Tropical Africa.

†MUTELA ALATA Lea.

**Spatha alata* LEA, Pr. Ac. N. Sci. Phila., 1864, p. 109; *Jl. Ac. N. Sci. Phila., 1866, p. 35, pl. XII, fig. 31; *Obs., XI, 1867, p. 39, pl. XII, fig. 31.—*PÆTEL, Conch. Sam., III, 1890, p. 188.

**Platiris* (*Spatha*) *alata* LEA, Syn., 1870, p. 89.

**Mutela alata* CLESSIN, Conch. Cab. Ano., 1876, p. 196, pl. LXII, figs. 7, 8.—*ANCEY, Bull. Soc. Zool. de Fr., 1894, p. 232.—*VON MARTENS, Besch., 1897, p. 253.

**Burtonia alata* ANCEY, Bull. Soc. Mal. Fr., VI, 1889, p. 38.

Lake Nyassa.

MUTELA SIMPSONI Ancey.

**Mutela simpsoni* ANCEY, Bull. Soc. Zool. de Fr., VII, 1894, p. 233, fig. 8.

**Mutela alata* var. *simpsoni* VON MARTENS, Besch., 1897, p. 253.

Shire and Karonga rivers, near Lake Nyassa.

MUTELA BOURGUIGNATI Bourguignat.[1]

**Mutela bourguignati* BOURGUIGNAT, Esp. Ouk., 1885, p. 8.—*SMITH, Ann. and Mag., X, 1892, p. 128, pl. XII, fig. 16.—*VON MARTENS, Besch., 1897, p. 255.

Lake Nyanza.

[1] Credited to Ancey, *in litt.*

(Group of *Mutela rostrata*.)

Shell somewhat inflated, thin, elongated, with a low, rounded posterior ridge ending in a point about midway up from the base; beaks low, smooth; epidermis bluish green, rayless; hinge line edentulous or having only the faintest vestiges of denticles; muscle scars large, shallow, indistinct; nacre bluish, shaded violet.

Animal the same as in typical *Mutela*.

†MUTELA ROSTRATA Rang.

**Iridina rostrata* Rang, Nouv. Ann. Mus., 1835, p. 316.—* Potiez and Michaud, Gall. Moll., 1844, p. 147, pl. lvi, fig. 1.

**Spatha rostrata* von Martens, Mal. Bl., XIII, 1866, p. 11.

**Mutela rostrata* Jickeli, Faun., 1874, p. 269.—* Westerlund, Faun. Pal., II, Pt. 7, 1890, p. 312.—* P.etel, Conch. Sam., III, 1890, p. 187.

**Mutelina rostrata* Bourguignat, Bull. Soc. Zool. de Fr., II, 1886, p. 488.

**Iridina cœlestis* Lea, Syn., 1836, p. 57; *Tr. Am. Phil. Soc., VI, 1838, p. 82, pl. xxii, fig. 70; *Obs., II, 1838, p. 82, pl. xxii, fig. 70.—* Troschel, Arch. für Nat., V, 1839, Pt. 2, p. 239.—* Hanley, Biv. Shells, 1843, p. 225.—* Catlow and Reeve, Conch. Nom., 1845, p. 68.—* Troschel, Arch. für Nat., XIII, 1847, I, p. 273.—* Sowerby, Conch. Icon., XVI, 1868, pl. ii, fig. 3.

**Platiris* (*Spatha*) *cœlestis* Lea, Syn., 1838, p. 33; 1852, p. 55; 1870, p. 89.

**Mutela cœlestis* H. and A. Adams, Gen. Rec. Moll., II, 1857, p. 506.—* Clessin, Conch. Cab. Ano., 1876, p. 193, pl. xxv, figs. 1, 2.—* P.etel, Conch. Sam., III, 1890, p. 187.

Tropical Africa.

Subgenus **PSEUDOMUTELA** Simpson, 1900.

(Type, *Mycetopus plicatus* Sowerby.[1])

Shell rather thin, elongate, wide, round and gaping behind, cut away and gaping at the anterior base; beaks low; surface rudely sulcate; a series of irregular nodulous projections extends down the low posterior ridge; hinge edentulous, with a kind of faint, broken internal ligament, with a wide prismatic streak behind; muscle scars distinct, united, the anterior protractor, however, separated and irregular; nacre lurid violet, iridescent behind.

†MUTELA PLICATA Sowerby.

* *Mycetopus plicatus* Sowerby, Conch. Icon., XVI, 1868, pl. ii, fig. 3; Icon. XVI, 1868, pl. ii, fig. 3.—* Fischer, Jl. de Conch., XXXVIII, 1890, p. 8.—* P.etel, Conch. Sam., III, 1890, p. 187.

* *Platiris* (*Mycetopus*) *plicatus* Lea, Syn., 1870, p. 90.

* *Mutela plicata* Jickeli, Faun. Moll. N. Ost-Af., 1874, p. 270.

Locality unknown, but Africa, no doubt. Sowerby credits it to Gray's manuscript in the British Museum.

[1] This is certainly not a *Mycetopoda*, but is evidently nearer *Mutela* than anything. I have placed it in that group as a subgenus, though it may be worthy of generic rank.

The following are unfigured *Mutelas:*

**Mutela lavigerina* BOURGUIGNAT, Un. and Ir., 1886, p. 26. Lake Tanganyika.
**Mutela moineti* BOURGUIGNAT, Un. et Ir., 1886, p. 27. Lake Tanganyika.
**Mutela subdiaphana* BOURGUIGNAT, Moll. Fluv. Ny., 1883, p. 5. Victoria Nyanza.
**Mutelina thottoni* ROCHEBRUNE, Bull. Soc. Mal. Fr., III, 1886, p. 7. Kongo.
**Mutelina legumen* ROCHEBRUNE, Bull. Soc. Mal. Fr., III, 1886, p. 6. Kongo.
**Mutelina mabilli* ROCHEBRUNE, Bull. Soc. Mal. Fr., III, 1886, p. 7. Kongo.
**Mutelina paludicola* ROCHEBRUNE, Bull. Soc. Mal. Fr., III, 1886, p. 8.
**Mutelina prasina* ROCHEBRUNE, Bull. Soc. Mal. Fr., III, 1886, p. 7. Kongo.
* *Iridina welwitschii* MORELET, Voy. de Angola, 1868, p. 98.

Genus CHELIDONOPSIS Ancey, 1887.

(Type, *Chelidoneura arietina* Rochebrune.)

Chelidoneura ROCHEBRUNE, S. B. Nat. Fr., 1886, p. 3.
Chelidonopsis ANCEY, Conch. Exchange, II, 1887, p. 22.

Shell elongated, thin, narrowed in front, gaping on the anterior basal part and winged on the front dorsal portion, rounded behind, with a pinched-up posterior ridge which develops into an open or closed tube near its hinder part; the shell ending in a diamond-shaped gap; epidermis shining slightly, concentrically grooved; hinge-line narrow, straight, with faint vestiges of denticles; a deep furrow inside marks the position of the posterior ridge; muscle scars faint; nacre brilliant, iridescent.

Animal unknown.

CHELIDONOPSIS ARIETINA Rochebrune.

* *Chelidoneura arietina* ROCHEBRUNE, Bull. Soc. Mal. Fr., III, 1886, p. 4, pl. I, figs. 1–4.

Gancini, Kongo.

†CHELIDONOPSIS HIRUNDO von Martens.

* *Spatha hirundo* VON MARTENS, S. B. Nat. Fr., 1881, p. 122; *Conch. Mitth., III, 1885?, p. 139, pl. XXVII;[1] Conch. Mitth., II. 1883, p. 139, pl. XXVII.
* *Spatha* (*Mutela*) *hirundo* ROCHEBRUNE, Bull. Soc. Mal., Fr., III, 1886, p. 2, pl. I, figs. 5, 6.
Chelidoneura hirundo VON MARTENS, S. B. Nat. Fr., 1886, p. 161, pl. I, figs. 5, 6.

Kongo region.

Genus BRAZZÆA Bourguignat, 1885.

(Type, *Brazzæa anceyi* Bourguignat.[2])

Brazzæa BOURGUIGNAT, Esp. Nouv. et Gen Nouv., 1885, p. 321.

Shell thin, transparent, brilliant wine-colored, elliptical, greatly inflated, with a slight post-dorsal wing, and a high double posterior ridge; beaks smooth, compressed, but the region below them full;

[1] Probably the young of *arietina.*

[2] This appears to be a valid genus, belonging to the *Mutelidæ.* I copy for the most part Bourguignat's description, which leaves out some essential characters. I have never seen any of the species.

hinge edentulous, filiform, with two ligaments, one internal, the other external; there are three groups of muscular impressions and several dorsal scars running in a row from the beak forward and downward; upper border of the left valve projecting over that of the right, forming a sinuous wing.

Animal unknown.

BRAZZÆA ANCEYI Bourguignat.

* *Brazzæa anceyi* BOURGUIGNAT, Esp. Ouk. et Tan., 1885, p. 33; * Icon., 1888, pl. XXVIII, figs. 1–4.—* VON MARTENS, Besch., 1897, p. 258.

* *Brazzæa eximia* BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 57; * Icon., 1888, pl. XXIX, fig. 5.

Lake Tanganyika.

BRAZZÆA BOURGUIGNATI Bourguignat.

* *Brazzæa bourguignati* BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 58; * Icon., 1888, pl. XXVIII, figs. 5, 6.

Lake Tanganyika.

BRAZZÆA ELONGATA Bourguignat.

* *Brazzæa elongata* BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 51; * Icon., 1888, pl. XXIX, figs. 2, 3.

Lake Tanganyika.

BRAZZÆA COULBOISI Bourguignat.

* *Brazzæa coulboisi* BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 50; * Icon., 1888, pl. XXIX, fig. 1.

Lake Tanganyika.

BRAZZÆA VENTROSA Bourguignat.

* *Brazzæa ventrosa* BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 45; * Icon., 1888, pl. XXIX, fig. 4.

Lake Tanganyika.

The following are unfigured species:

Brazzæa randabeli BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 46.
Brazzæa moineti BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 47.
Brazzæa jourdyi BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 48.
Brazzæa charbonnieri BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 52.
Brazzæa larigerina BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 53.
Brazzæa bridouxi BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 54.
Brazzæa newcombiana BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 55.

All from Lake Tanganyika.

Genus PLEIODON Conrad, 1834.

(Type, *Pleiodon ovatus* Swainson.)

Pleiodon CONRAD, Jl. Ac. N. Sci. Phila., VII, 1834, p. 178.

Shell elliptical, inflated, solid, with a rounded posterior ridge, and full, smooth beaks; epidermis smooth, shining, generally rayless; hinge

[1] Said by Bourguignat to be of Joubert *in litt.*

plate wide, nearly straight, set with strong, irregular, taxodont teeth throughout its length; beak cavities moderate, with a row of dorsal scars running obliquely downward and forward; anterior and posterior muscle scars well defined.

Animal with the palpi semilunar, united to the mantle by a straight border, longer than wide; outer gills generally larger than the inner, united their whole length to the mantle; inner united to the abdominal sac; genitalia occupying each side the lateral part of the visceral mass as far forward as the foot; mantle closed below the branchial siphon, and united into branchial and anal siphons; anal opening rather small; branchial opening large, the two separated by a solid bridge which solders together the extremities of the four branchiæ; both orifices have a thickened inner edge, the branchial being furnished with short tubercles or granules; mantle united below posteriorly one-fourth its length; foot large and strong; adductor muscles strong (Pelseneer).

Subgenus PLEIODON Conrad.

Characters as in the genus.

†PLEIODON OVATUS Swainson.

* *Iridina ovata* SWAINSON, Phil. Mag., LXI, 1823, p. 112.—* OKEN, Isis, 1834, p. 458.—* REEVE, Conch. Syst., I, 1841, p. 122, pl. XCIII.—* HANLEY, Biv. Shells, 1843, p. 225.—* CATLOW and REEVE, Conch. Nom., 1845, p. 68; * Elements of Conch., II, 1860, pl. XXXIII, fig. 184.—* CLESSIN, Conch. Cab. Ano., 1875, p. 230, pl. LXX, fig. 2; LXXI, fig. 2.

* *Platiris* (*Iridina*) *ovata* LEA, Syn., 1838, p. 33; 1852, p. 54; 1870, p. 88.

* *Pleiodon ovata* CONRAD, Jl. Ac. Nat. Sci. Phila., VII, 1854, p. 298; * H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 506.

* *Pleiodon ovatus* CHENU, Man., 1859, II, p. 148, fig. 728.—* SOWERBY, Conch. Icon., XVI, 1866, pl. I, fig. 1. —* PÆTEL, Conch. Sam., III, 1890, p. 188.

Iridina exotica CHILDREN, Brande's Jl., XV, 1823, p. ?

* *Pleiodon macmurtrici* CONRAD, Jl. Ac. Nat. Sci. Phila., VII, 1834, p. 13, pl. XIII; VII, 1854, p. 298.

* *Margarita* (*Pleiodon*) *macmurtrici* LEA, Syn., 1836, p. 55.

* *Iridina raleus* JAY, Cat., 1850, p. 70.[1]

* *Mutela raleus* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 506.—* PÆTEL, Conch. Sam., III, 1890, p. 187.

* *Platiris* (*Iridina*) *leaii* LEA, Syn., 1852, p. 54; 1870, p. 88.[2]

* *Pleiodon leaii* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 506.—* PÆTEL, Conch. Sam., III, 1890, p. 188.

* *Pleiodon splendens* CONRAD, Jl. Ac. Nat. Sci. Phila., VII, 1854, p. 299.

* *Iridina splendida* CHENU, Ill. Conch., 1858, pl. I, figs. 2, 2*a*, 2*b*, 2*c*, 2*d*.

West Africa.

The following are unfigured species of *Pleiodon*:

* *Pleiodon diolibanus* BOURGUIGNAT, Moll. Egypt and Ab., 1879, p. 47.

* *Pleiodon elongatus* BOURGUIGNAT, Moll. Egypt and Ab., 1879, p. 47. Senegal River.

[1] Said to be of Parreyss.

[2] Presented to Dr. Lea by Sowerby as *Iridina leaii*. Lea believes it to be a young *ovatus*.

* *Pleiodon letourneauxianus* BOURGUIGNAT, Moll. Egypt and Ab., 1879, p. 48. Senegal River.

* *Pleiodon pachyodon* BOURGUIGNAT, Moll. Egypt and Ab., 1879, p. 43.

Subgenus CAMERONIA Bourguignat, 1879.

(Type, *Iridina spekii* Woodward.)

Anterior end of the hinge plate usually (not always) split up lengthwise into irregular teeth, which bear tubercles on their surfaces.[1]

The mantle of *P. spekii* has a decided palleal sinus behind. (Pelseneer.)

† **PLEIODON SPEKII** Woodward.

* *Iridina* (*Pleiodon*) *spekii* WOODWARD, Pr. Zool. Soc. Lond., 1859, p. 348, pl. XLVII, fig. 2; * Ann. and Mag., V, 1860, p. 337.

* *Pleiodon spekii* SOWERBY, Conch. Icon., XVI, 1866, pl. I, fig. 2.

* *Platiris* (*Iridina*) *spekii* LEA, Syn., 1870, p. 88.

* *Cameronia spekii* BOURGUIGNAT, Moll. Egypt and Ab., 1879, p. 43.

* *Iridina spekii* CLESSIN, Conch. Cab. Ano., 1875, p. 232, pl. LXX, fig. 2.

* *Pleiodon* (*Cameronia*) *spekii* CROSSE, Jl. de Conch, XXIX, 1881, p. 130.

* *Pleiodon spekii* SMITH, Proc. Zool. Soc., 1881, p. 296, pl. XXXIV, figs. 31, 31*a*.—* PÆTEL, Conch. Sam., III, 1890, p. 188.

* *Mutela* (*Iridina*) *spekii* VON MARTENS, Besch., 1897, p. 256.

* *Cameronia gigantea* BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 68; * Icon. Mal., 1888, pl. XXXV, fig. 1.

* *Cameronia admirabilis* BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 69; * Icon. Mal., 1888, pl. XXXIV, fig. 1.

* *Cameronia coulboisi* BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 77; * Icon. Mal., 1888, pl. XXXI, figs. 1, 2.

Cameronia josseti BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 82; * Icon. Mal., 1888, pl. XXXII, fig. 3.

* *Cameronia paradoxa* BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 91; * Icon. Mal., 1888, pl. XXXII, fig. 1.

Lake Tanganyika.

PLEIODON LANDEAUI Bourguignat.

* *Cameronia landeaui* BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 74; * Icon. Mal., 1888, pl. XXXI, fig. 3.[2]

Lake Tanganyika.

PLEIODON BOURGUIGNATI Bourguignat.[3]

* *Cameronia bourguignati* BOURGUIGNAT, Esp. Ouk., 1885, p. 26; * Icon. Mal., 1888, pl. XXXIII.

Lake Tanganyika.

The following are unfigured species of *Cameronia*.

* *Cameronia anceyi* BOURGUIGNAT, Esp. Ouk., 1885, p. 30. Lake Tanganyika.

* *Cameronia bridouxi* BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 71.

* *Cameronia charbonnieri* BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 83. Lake Tanganyika.

[1] The splitting up of the anterior end of the hinge is altogether irregular, and may be due to disease, as the hinge is sometimes entire.

[2] Probably a short, diseased *spekii*.

[3] Credited to Ancey *in litt.* by Bourguignat.

* *Cameronia complanata* BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 76. Lake Tanganyika.
* *Cameronia dromauxi* BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 84. Lake Tanganyika.
* *Cameronia giraudi* BOURGUIGNAT, Nat. Prod., 1885, p. 107. Lake Tanganyika.
* *Cameronia guillemeti* BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 72. Lake Tanganyika.
* *Cameronia jouberti* BOURGUINAT, Un. et Ir. Tan., 1886, p. 88. Lake Tanganyika.
* *Cameronia larigirina* BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 85. Lake Tanganyika.
* *Cameronia locardiana* BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 78. Lake Tanganyika.
* *Cameronia marioniana* BOURGUIGNAT, Esp. Ouk., 1885, p. 28. Lake Tanganyika.
* *Cameronia mabilliana* BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 86. Lake Tanganyika.
* *Cameronia moineti* BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 89. Lake Tanganyika.
* *Cameronia pulchella* BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 73. Lake Tanganyika.
* *Cameronia obtusa* BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 75. Lake Tanganyika.
* *Cameronia randebeli* BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 90. Lake Tanganyika.
* *Cameronia revoiliana* BOURGUIGNAT, Moll. Tan., 1885, p. 107. Lake Tanganyika.
* *Cameronia rynckii* BOURGUIGNAT, Un. et Ir. Tan., 1886, p. 81. Lake Tanganyika.

Genus MONOCONDYLÆA d'Orbigny, 1835.

(Type, *Monocondylæa paraguayana* d'Orbigny.)

Aplodon SPIX (not of Rafinesque, 1818), Test. Fluv. Bras., 1827, pl. XXV, figs. 1, 2.
Monocondylæa D'ORBIGNY, Guerin Mag., 1835, p. 37.
Spixoconcha PILSBRY, Nautilus, VII, 1893, p. 30.

Shell rounded to obovate, rather solid, with a low, posterior ridge which is generally bordered by two or more dark, radiating bands; epidermis dull olive green to olive brown, cloth like; hinge with two irregular teeth under the beak in the left valve and two in the right, the posterior under the beak, the anterior in front of it and interlocking with those of the left valve, the whole generally more or less tuberculate; nacre soft, silvery, with iridescent shades; anterior scars united; posterior indistinct; prismatic layer wide.

Animal with the marsupium occupying the whole length of the inner branchiæ; gills very large, curved below, inner very much the larger, united the whole length of the abdominal sac; palpi small, round below, attached along their upper edge; mantle thick, greatly thickened at the edge, with a few papillæ in front of the branchial opening below; branchial opening large, with numerous small knob-like papillæ; anal opening large, without papillæ, separated completely from the branchial opening by a bridge; superanal opening not closed below.

(Group of *Monocondylæa guarayana*.)

Shell obovate, inflated, solid, often slightly produced just behind the center of the base; beaks full, turned inward and forward.

†MONOCONDYLÆA GUARAYANA d'Orbigny.

* *Monocondylæa guarayana* D'ORBIGNY, Guer. Mag., 1835, p. 38; * Voy. Am. Mer., 1843, p. 614, pl. LXVIII, figs. 4–5.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 501; III pl. CXVII, fig. 3.—* CHENU, Man., 1859, II, p. 145, fig. 715.—* PÆTEL, Conch. Sam., III, 1890, p. 174.

* *Margarita* (*Monocondylæa*) *guarayana* LEA, Syn., 1838, p. 28.

* *Unio guarayana* HANLEY, Test. Moll., 1842, p. 213; * Biv. Shells, 1843, p. 213, pl. XXII, fig. 14.—* SOWERBY, Conch. Icon., XVI, 1868, pl. XCVI, fig. 524.

* *Margaron* (*Monocondylæa*) *guarayana* LEA, Syn., 1852, p. 45; 1870, p. 73.

Bolivia.

MONOCONDYLÆA INERME Spix.

* *Aplodon inerme* SPIX, Test. Fluv. Bras., 1827, p. 32, pl. XXV, figs. 1–2.—* VON IHERING, Arch. für Nat.,1890, p. 126, pl. IX, figs. 1–3.

South Brazil.

†MONOCONDYLÆA PARCHAPPII d'Orbigny.

* *Monocondylæa parchappii* D'ORBIGNY, Guer. Mag., 1835, p. 38; * Voy. Am. Mer., 1843, p. 615, pl. LXVIII, figs. 1–3.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 501.—* PÆTEL, Conch. Sam., III, 1890, p. 174.

* *Margarita* (*Monocondylæa*) *parchappii* LEA, Syn., 1838, p. 28.

* *Unio parchappii* HANLEY, Test. Moll., 1842, p. 212; * Biv. Shells, 1843, p. 212, pl. XXII, fig. 13.—* CATLOW and REEVE, Conch. Nom., 1845, p. 62.

* *Margaron* (*Monocondylæa*) *parchappii* LEA, Syn., 1852, p. 45; 1870, p. 73.

*† *Monocondylæa pazii* LEA, Pr. Ac. N. Sci. Phila., X, 1866, p. 34; * Jl. Ac. N. Sci. Phila., VI, 1868, p. 273, pl. XXXVI, fig. 88; * Obs., XII, 1869, p. 36, pl. XXXVI, fig. 88.—* CLESSIN, Conch. Cab. Ano., 1876. p. 251, pl. LXXIX, figs. 6–7.—* PÆTEL, Conch. Sam., III, 1890, p. 174.

* *Margaron* (*Monocondylæa*) *pazii* LEA, Syn., 1870, p. 73.

Argentina.

†MONOCONDYLÆA PARAGUAYANA d'Orbigny.

* *Monocondylæa paraguayana* D'ORBIGNY, Guer. Mag., 1835, p. 37.—* SOWERBY, Conch. Man., 1839, fig. 149.—* D'ORBIGNY, Voy. Am. Mer., 1843, p. 612, pl. LXX, figs. 5–7.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 501.—* CLESSIN, Conch. Cab. Ano., 1876, p. 245, pl. LXXVIII, figs. 1, 2.—* PÆTEL, Conch. Sam., III, 1890, p. 174.

* *Margarita* (*Margaritana*) *paraguayana* LEA, Syn., 1838, p. 27.

* *Unio paraguayana* HANLEY, Test. Moll., 1842, p. 212; * Biv. Shells, 1843, p. 212, pl. XXII, fig. 17.—* SOWERBY, Conch. Icon., XVI, 1866, pl. LII, fig. 273.

* *Margaron* (*Monocondylæa*) *paraguayana* LEA, Syn., 1852, p. 45; 1870, p. 73.

* *Unio paraguayanus* CATLOW and REEVE, Conch. Nom., 1845, p. 62.

*† *Monocondylæa minuana* D'ORBIGNY, Guer. Mag., 1835, p. 37; * Voy. Am. Mer., 1843, p. 612, pl. LXX, figs. 8–10.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 501.—* PÆTEL, Conch. Sam., III, 1890, p. 174.

* *Margarita* (*Margaritana*) *minuana* LEA, Syn., 1838, p. 28.

* *Margaron* (*Monocondylæa*) *minuana* LEA, Syn., 1852, p. 45; 1870, p. 73.

* *Unio minuanus* HANLEY, Test. Moll., 1842, p. 213; * Biv. Shells, 1843, p. 213, pl. XXII, fig. 18.—* SOWERBY, Conch. Icon., XVI, 1868, pl. XCI, fig. 497.

Rio de la Plata drainage.

†MONOCONDYLÆA RETICULATA Moricand.

* *Monocondylæa reticulata* MORICAND, Rev. et Mag., X, 1858, p. 453, pl. XV, fig. 2.
* *Margaron* (*Monocondylæa*) *reticulata* LEA, Syn., 1870, p. 72.
* *Margaritana reticulata* PÆTEL, Conch. Sam., III, 1890, p. 173.
* *Unio reticulatus* SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXVII, fig. 458.
* *Aplodon reticulatus* VON IHERING, Arch. für Nat., 1893, p. 115.

Brazil.

MONOCONDYLÆA COSTULATA Moricand.

* *Monocondylæa costulata* MORICAND, Rev. et Mag. Zool., X, 1858, p. 453, pl. XV, fig. 1; * SOWERBY, Conch. Icon., XVI, 1868, pl. LXXXVIII, fig. 470.—* PÆTEL, Conch. Sam., III, 1890, p. 174.
* *Margaron* (*Monocondylæa*) *costulata* LEA, Syn., 1870, p. 72.

Brazil.

†MONOCONDYLÆA CORRIENTESENSIS d'Orbigny.

* *Monocondylæa corrientesensis* D'ORBIGNY, Guer. Mag., 1835, p. 38; * Voy. Am. Mer., 1843, p. 615, pl. LXVII, figs. 8–10.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 501.—* CLESSIN, Conch. Cab. Ano., 1876, p. 246, pl. LXXVIII, figs. 3, 4.—* PÆTEL, Conch. Sam., III, 1890, p. 174.
* *Margarita* (*Monocondylæa*) *corrientesensis* LEA, Syn., 1838, p. 28.
* *Unio corrientesensis* HANLEY, Test. Moll., 1842, p. 212; * Biv. Shells, 1843, p. 212, pl. XXII, fig. 15.—* CATLOW and REEVE, Conch. Nom., 1845, p. 57.—* SOWERBY, Conch. Icon., XVI, 1868, pl. XCIII, fig. 509.
* *Margaron* (*Monocondylæa*) *corrientesensis* LEA, Syn., 1852, p. 45; 1870, p. 73.

Argentina.

MONOCONDYLÆA JASPIDEA Hupe.

* *Unio jaspidea* HUPE, An. Nouv., III, 1857, p. 83, pl. XVII, fig. 2.[1]
* *Margaron* (*Unio*?) *jaspideus* LEA, Syn., 1870, p. 37.

Amazon.

(Group of *Monocondylæa franciscana*.)

Shell moderately inflated, lenticular, rounded, not very solid; sometimes slightly produced at the post basal region; beaks rather low.

†MONOCONDYLÆA FRANCISCANA Moricand.

* *Unio* (*Monocondylæa*) *franciscana* MORICAND, Mem. Soc. Hist. Nat. Gen., VIII, 1837, p. 39, pl. III, figs. 14–17.—* TROSCHEL, Arch. für Nat., VIII, 1842, Pt. 2, p. 404.
* *Margarita* (*Margaritana*) *franciscana* LEA, Syn., 1838, p. 35.
* *Margaron* (*Monocondylæa*) *franciscana* LEA, Syn., 1852, p. 45; 1870, p. 72.
* *Monocondylæa franciscana* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 501.—* CLESSIN, Conch. Cab. Ano., 1876, p. 251, pl. LXXIV, figs. 4, 5.—* PÆTEL, Conch. Sam., III, 1890, p. 174.
* *Aplodon franciscana* VON IHERING, Arch. für Nat., 1893, p. 115.

Brazil.

†MONOCONDYLÆA LENTIFORMIS Lea.

* *Monocondylæa lentiformis* LEA, Pr. Ac. N. Sci. Phila., X, 1866, p. 34; * Jl. Ac. N. Sci. Phila., VI, 1868, p. 272, pl. XXXVI, fig. 86; * Obs., XII, 1869, p. 32, pl. XXXVI, fig. 86.—* CLESSIN, Conch. Cab. Ano., 1876, p. 250, pl. LXXIX, figs. 4, 5.—* PÆTEL, Conch. Sam., 1890, p. 174.

[1] The figure shows the teeth, which appear to be those of a *Monocondylæa*.

* *Margaron* (*Monocondylæa*) *lentiformis* LEA, Syn., 1870, p. 72.
* *Aplodon lentiformis* VON IHERING, Arch. für. Nat., 1893, p. 67.—* NEHRING, J. de Conch., 1894, p. 82.

Southern Brazil.

The following species is unknown to me:

* *Monocondylæa tamsana* DUNKER, Mal. Bl., V, 1858, p. 226.

Genus IHERINGELLA Pilsbry, 1893.

(Type, *Plagiodon isocardioides* Lea.)

Plagiodon LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 79.
Iheringella PILSBRY, Nautilus, VII, 1893, p. 30.

Shell solid, inflated, rounded to rhomboid in outline, with a more or less developed posterior ridge; beaks high, curved inward and forward, without sculpture; epidermis dull olive, cloth-like; hinge teeth imperfectly developed, nodulous or more or less broken into denticles, there being an irregular tooth in the left valve under the beak, sometimes partially bifid, and two in the right valve, with the pit between them under the beak; anterior muscle scars deep, partially united; posterior scars shallow; nacre soft, bluish silvery, iridescent behind.

Animal unknown.

(Group of *Iheringella isocardioides.*)

Shell rhomboid or *isocardia* shaped, with a high, distinct, strongly curved posterior ridge; beaks decidedly full and turned forward.

†IHERINGELLA ISOCARDIOIDES Lea.

* *Plagiodon isocardiodes* LEA, Pr. Ac. N. Sci. Phila., VIII, 1856, p. 79.[1]
* *Plagiodon isocardioides* LEA, Obs., VI, 1857, p. 38, pl. XXXII, fig. 32; * Jl. Ac. N. Sci. Phila., III, 1858, p. 318, pl. XXXII, fig. 32.—* KUSTER, Conch. Cab. Unio, 1862, p. 292, pl. XCVII, figs. 8–10.
* *Unio isocardioides* SOWERBY, Conch. Icon., XVI, 1868, pl. XC, fig. 484.—* PETEL, Conch. Sam., III, 1890, p. 156.
* *Margaron* (*Plagiodon*) *isocardioides* LEA, Syn., 1870, p. 71.

Rio de la Plata; Eastern Peru?.

IHERINGELLA SEMISULCATA H. Adams.

* *Monocondylæa* (*Plagiodon*) *semisulcata* H. ADAMS, Pr. Zool. Soc. Lond., 1870, p. 376, pl. XXVII, fig. 3.

Eastern Peru.

(Group of *Iheringella rotundata.*)

Shell somewhat rounded, sublenticular, posterior ridge rather low.

†IHERINGELLA ROTUNDATA Mousson.

* *Plagiodon rotundatus* MOUSSON, Mal. Bl., XVI, 1869, p. 187.—* PFEIFFER, Nov. Conch., IV, 1876, p. 139, pl. CXXXI, figs. 8, 9.

South America.

[1] Printed as above. A typographical error, probably.

IHERINGELLA BALZANI von Ihering.

* *Plagiodon balzani* VON IHERING, Arch. für Nat., 1893, p. 69, pl. III, fig. 3.

Rio Paraguay; San Paulo, Brazil.

Genus FOSSULA Lea, 1870.

(Type, *Monocondylæa fossiculifera* d'Orbigny.)

Fossula LEA, Syn., 1870, p. 72 (footnote).

Shell obovate, inflated, solid, with rather high beaks and a low posterior ridge; epidermis olive-brown, somewhat smooth, sometimes slightly rayed; there is an irregular tooth in the left valve under the beak, and behind it a cavity; in the right valve there is a cavity under the beak, and an irregular tooth in front of and another behind it; the teeth and cavities are generally partly covered with brownish or amber-colored matter, and more or less pitted; anterior cicatrices well marked, united; posterior faint; prismatic border wide.

Animal unknown.

† FOSSULA FOSSICULIFERA d'Orbigny.

* *Monocondylæa fossiculifera* D'ORBIGNY, Guer. Mag., 1835, p. 38; * Voy. Am. Mer., 1843, p. 614, pl. LXXX, figs. 5–7.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 501.—* CLESSIN, Conch. Cab. Ano., 1876, p. 249, pl. XLXIX, figs. 1, 2.—* PÆTEL, Conch. Sam., III, 1890, p. 174.

* *Margarita* (*Margaritana*) *fossiculifera* LEA, Syn., 1838, p. 28.

* *Unio fossiculifera* HANLEY, Test. Moll., 1842, p. 213; * Biv. Shells, 1843, p. 213, pl. XXII, fig. 19.—* SOWERBY, Conch. Icon., XVI, 1868, pl. XCVI, fig. 521.

* *Margaron* (*Monocondylæa*) *fossiculifera* LEA, Syn., 1852, p. 45; 1870, p. 73.

* *Fossula fossiculifera* VON IHERING, Arch. für Nat., 1893, p. 64, pl. III, fig. 2.

* *Unio fossiculiferus* CATLOW and REEVE, Conch. Nom., 1845, p. 59.

* *Anodonta fusciculifera* PÆTEL, Conch. Sam., III, 1890, p. 179.

Parana River, South America.

FOSSULA BALZANI von Ihering.

* *Fossula balzani* VON IHERING, Arch. für Nat., 1893, p. 65, pl. III, fig. 1.

Rio Paraguay; Rio Apae, South America.

Genus LEILA Gray, 1840.

(Type, *Anodonta blainvilleana* Lea.)

Columba LEA (not *Columba* Linnæus, aves, 1758), Tr. Am. Phil. Soc., V, 1833, p. 78.
Leila GRAY, Syn. Brit. Mus., 1840, p. 142.

Shell large, obovate, inflated, with a straight hinge line which is produced into a slight wing before and behind, the posterior end bluntly pointed and somewhat truncate above, with a faint posterior ridge; beaks full, smooth, epidermis olive, generally smooth; hinge edentulous; beak cavities rather shallow; dorsal scars small and numerous, running in a straight line from behind the beaks downward and forward; posterior muscle scars united, large; palleal line generally showing a sinus.[1]

[1] Conchologically this genus seems to be very closely related to *Glabaris*, especially to the group of *G. trapesialis*. Some of the shells of that genus have a slight dorsal wing in front and behind, and traces of a palleal sinus.

Animal having the mantle united behind into two short, separate, contractile siphons, according to Gray.[1]

†LEILA BLAINVILLEANA Lea.[2]

* *Anodonta blainvilleana* LEA, Tr. Am. Phil. Soc., V, 1834, p. 77, pl. XII, fig. 35; * Obs., I, 1834, p. 189, pl. XII, fig. 35.—* HANLEY, Test. Moll., 1842, p. 222; * Biv. Shells, 1843, p. 222, pl. XXIV, fig. 18.
* *Margarita* (*Anodonta*) *blainvilleana* LEA, Syn., 1836, p. 53; 1838, p. 31.
* *Anodon blainvilleana* CATLOW and REEVE, Conch. Nom., 1845, p. 66.
* *Margaron* (*Anodonta*) *blainvilleana* LEA, Syn., 1852, p. 52.
* *Leila blainvilleana* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 507; III, pl. CXIX, figs. 4, 4*a*.—* CHENU, Man., 1859, II, p. 148, fig. 730.
* *Columba blainvilleana* CLESSIN, Conch. Cab. Ano., 1876, p. 253, pl. LXXXVI, figs. 1, 2.—* PÆTEL, Conch. Sam., III, 1890, p. 188.
* *Anodon parishii* GRAY, Pr. Zool. Soc. Lond., 1834, p. 57.[3]—* MÖLLER, Syn. Nov. Gen., 1836, p. 195.—* CATLOW and REEVE, Conch. Nom., 1845, p. 67.
* *Margarita* (*Anodonta*) *parishii* LEA, Syn., 1836, p. 53; 1838, p. 31.
* *Anodonta parishii* HANLEY, Test. Moll., 1842, p. 222; * Biv. Shells, 1843, p. 222.—* PÆTEL, Conch. Sam., III, 1890, p. 183.
* *Margaron* (*Anodonta*) *parishii* LEA, Syn., 1852, p. 52.
* *Leila parishii* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 507.
* *Anodon hians* SOWERBY, Conch. Icon., XVII, 1867, pl. IV, fig. 8.

Peru; Brazil; south to Argentina.

†LEILA ESULA d'Orbigny.

* *Iridina esula* D'ORBIGNY, Guerin Mag., 1835, p. 43; * Voy. Am. Mer., 1843, p. 397.
Anodonta esula JAN, Charpentier and Jan, Cat., 1837, p. 24.[4]
* *Margarita* (*Anodonta*) *esula* LEA, Syn., 1838, p. 32.
* *Margaron* (*Anodonta*) *esula* LEA, Syn., 1852, p. 52.
* *Margaron* (*Columba*) *esula* LEA, Syn., 1870, p. 86.
* *Leila esula* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 507.
* *Anodonta arcuata* HANLEY, Biv. Shells, 1843, p. 223.
* *Leila pulvinata* HUPE, Moll. Nouv., III, 1857, p. 90, pl. XX, fig. 1.
* *Columba pulvinata* CLESSIN, Conch. Cab. Ano., 1876, p. 255, pl. LXXV, figs. 1, 2.—* PÆTEL, Conch. Sam., III, 1890, p. 188.
* *Anodon pulvinatus* SOWERBY, Conch. Icon., XVII, 1867, pl. V, fig. 10.
* *Leila castelnaudi* HUPE, Moll. Nouv., III, 1857, p. 91, pl. XIX, fig. 1.—* VON MARTENS, Mal. Bl., XV, 1868, p. 201.
* *Anodon castelnaudi* SOWERBY, Conch. Icon., XVII, 1868, pl. XX, fig. 79.
* *Columba castelnaudii* CLESSIN, Conch. Cab. Ano., 1876, p. 254, pl. LXXXIV, figs. 1, 2.—* PÆTEL, Conch. Sam., III, 1890, p. 188.

Bolivia; Brazil; Paraguay.

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[1] Ann. and Mag. Nat. Hist., VI, p. 316.

[2] The volume of the transactions in which Lea's name was published was issued, according to Scudder, in August or September, 1834. Gray read the paper containing the description of his *Anodon parishii* before the Zoological Society on July 8 of the same year, and the date of publication of that volume of the proceedings is 1834. As I do not know just when it appeared, and as Lea's is the better known name, I retain the latter.

[3] Gray states in a letter to Lea, November, 1834, that his *A. parishii* and Lea's *blainvilliana* are the same.

[4] According to Lea. I have not seen this paper. The species is quite commonly credited to Jan, but it was published by d'Orbigny under the name of *Iridina esula* in 1835, and I am not aware that Jan described it earlier than 1837.

LEILA SPIXII von Ihering.

**Anodon giganteus* SPIX (part), Test. Fluv. Bras., 1827, p. 27, pl. XIX, fig. 1 (young).
**Anodonta gigantea* KUSTER, Conch. Cab. Ano. 1853, p. 6, pl. I, fig. 2 (young).
* *Columba spixii* VON IHERING, Arch. für Nat., 1890, p. 135, pl. IX, fig. 4.

Amazon River.

Genus GLABARIS Gray, 1847.

(Type, *Anodonta exotica* Lamarck.)

Glabaris GRAY, Pr. Zool. Soc. Lond., 1847, p. 197.

Shell rounded to elongated, inflated, subsolid; beaks full, smooth; epidermis smooth or clothlike, rarely having faint rays; hinge line straight or slightly curved, edentulous, sometimes a little sinuous, the escutcheon distinct and large; nacre soft tinted, the prismatic border wide and well defined.

Animal with the marsupium occupying the whole of the inner branchiæ, which are united their entire length to the abdominal sac; palpi generally semicircular or kidney shaped; attached along their entire upper length, not projecting posteriorly; branchial and anal openings with or without papillæ, not united into siphons in the specimens examined, separated by a strong bridge; superanal opening not closed below.

Section GLABARIS Gray, 1847

(Type, *Anodonta exotica* Lamarck.)

Shell rounded to elliptical; posterior ridge low or wanting.

(Group of *Glabaris patagonicus*.)

Shell solid, inflated, obovate, usually somewhat produced behind the center of the base; beaks quite full, projecting above the hinge line; epidermis olive brown, rather smooth, generally rayless; anterior muscle scars well defined.

Animal with the gills large, rounded below; palpi rather large; mantle thickened at edge and furnished with palpi in front of the branchial opening; branchial opening large, with numerous minute papillæ; anal opening large, with no papillæ.

†GLABARIS PATAGONICUS Lamarck.

**Anodonta patagonica* LAMARCK, An. sans. Vert., VI, 1819, p. 88.—* LAMARCK, Enc. Méth., II, 1827, p. 147, pl. 203, fig. 1.—* STARK, Nat. Hist., II, 1828, p. 89.—*HANLEY, Test. Moll., 1842, p. 221; *Biv. Shells, 1843, p. 221.—*KUSTER, Conch. Cab. Ano., 1853, p. 50, pl. XII, fig. 2.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 504.—*VON MARTENS, Mal. Blatt., XV, 1868, p. 198.—* PÆTEL, Conch. Sam., III, 1890, p. 183.
**Margarita* (*Anodonta*) *patagonica* LEA, Syn., 1836, p. 52; 1838, p. 31.
**Anodon patagonica* CATLOW and REEVE, Conch. Nom., 1845, p. 67.
**Margaron* (*Anodonta*) *patagonica* LEA, Syn., 1852, p. 51; 1870, p. 82.

* *Anodon trapezeus* SPIX, Test. Fluv. Bras., 1827, p. 28, pl. XX, fig. 1.
* *Anodonta trapezeum* D'ORBIGNY, Voy. Am. Mer., 1843, pp. 6, 19.
* *Anodonta trapezea* KUSTER, Conch. Cab. Ano., 1853, p. 7, fig. 3.
* *Glabaris trapezea* VON JHERING, Arch. für Naturg., 1893, p. 57.
* † *Anodonta lato-marginata* LEA, Tr. Am. Phil. Soc., V, 1834, p. 76, pl. XII, fig. 34; * Obs., I, 1834, p. 188, pl. XII, fig. 34.—* HANLEY. Test. Moll., 1842, p. 221; * Biv. Shells, 1843, p. 221, pl. XXIV, fig. 14.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 504.—* CHENU, Man., II, 1859, p. 146, fig. 724.—* CLESSIN, Conch. Cab., 1873, p. 76, pl. XXI, figs. 3, 4.
* *Margarita* (*Anodonta*) *lato-marginata* LEA, Syn., 1836, p. 53; 1838, p. 31.
* *Margaron* (*Anodonta*) *lato-marginata* LEA, Syn., 1852, p. 51; 1870, p. 82.
* *Anodon lato-marginatus* SOWERBY, Conch. Icon., XVII, 1867, pl. II, fig. 3.
* *Anodon lati-marginata* CATLOW and REEVE, Conch. Nom., 1845, p. 67.
* *Anodonta lati-marginata* STROBEL, Mat. Mal., Pt. 1, 1874, p. 67.—* PÆTEL, Conch. Sam., III, 1890, p. 181.
* *Anodonta membranacea* D'ORBIGNY, Voy. Am. Mer., 1843, p. 616, pl. LXXIX, fig. 11.
* *Anodonta solida* KUSTER, Conch. Cab. Ano., 1853, p. 50, pl. XII, fig. 1.
* ? † *Anodonta uruguayensis* LEA,[1] Pr. Ac. N. Sci. Phila., IV, 1860, p. 92; * Jl. Ac. N. Sci. Phila., V, 1863, p. 393, pl. XLVIII, fig. 302; * Obs., X, 1863, p. 29, pl. XLVIII, fig. 302.—* CLESSIN, Conch. Cab., 1874, p. 114, pl. XXXVIII, figs. 1, 2.—* SOWERBY, Conch. Icon., XVII, 1870, pl. XXX, fig. 121,
* *Margaron* (*Anodonta*) *uruguayensis* LEA, Syn., 1870, p. 83.
* *Columbia uruguayensis* PÆTEL, Conch. Sam., III, 1890, p. 188.
* *Anodonta sinuosa* CLESSIN, Conch. Cab. Ano., 1873, p. 90, pl. XXII, figs. 1, 2.
* *Anodonta serpentina* CLESSIN, Conch. Cab. Ano., 1876, p. 223, pl. LXXV, figs. 2, 3.—* PÆTEL, Conch. Sam., III, 1890, p. 184.

GLABARIS PATAGONICUS var. FELIX Pilsbry.

* *Glabaris lato-marginatus* LEA, var. *felix* PILSBRY, Pr. Ac. N. Sci. Phila., 1869, p. 563, pl. XXVI, fig. 8.

! Southern South America, east of the Andes; the variety in Colonia, Uruguay.

GLABARIS CRASSUS Swainson.

* *Anodon crassus* SWAINSON, Zool. Ill., 1st ser., III, 1823, pl. CLXVII.
* *Margarita* (*Anodonta*) *crassa* LEA, Syn., 1836, p. 23; 1838, p. 32.
* *Anodonta crassa* HANLEY, Test. Moll., 1842, p. 222; * Biv. Shells, 1843, p. 222.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 504.—* PÆTEL, Conch. Sam., III, 1890, p. 178.
* *Anodon crassa* CATLOW and REEVE, Conch. Nom., 1845, p. 66.
* *Margaron* (*Anodonta*) *crassa* LEA, Syn., 1852, p. 52; 1870, p. 83.

Rio de la Plata.

† GLABARIS WYMANII Lea.

* *Anodonta wymanii* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 91; * Jl. Ac. N. Sci. Phila., V, 1863, p. 390, pl. XLIV, fig. 294; * Obs., X, 1863, p. 26, pl. XLIV, fig. 294.—* CLESSIN, Conch. Cab. Ano., 1873, p. 104, pl. XXXII, figs. 1, 2.—* PÆTEL, Conch. Sam., III, 1890, p. 186.

[1] An old worn shell—the type—is the only one in the Lea collection, save a few very young that are doubtfully the same. It is a little more inflated than most specimens that are called *lato-marginata*, but not more than some are, and I hardly think it distinct.

* *Margaron* (*Anodonta*) *wymanii* LEA, Syn., 1870, p. 80.
* *Anodon wymani* SOWERBY, Conch. Icon., XVII, 1870, pl. XXX, fig. 117.

Uruguay River, South America.

† GLABARIS SIRIONIS d'Orbigny.

* *Anodonta sirionis* D'ORBIGNY, Mag. Zool., 1835, p. 40.—* HANLEY, Test. Moll., 1842, p. 221; * Biv. Shells, 1843, p. 221.—* D'ORBIGNY, Voy. Am. Mer., 1843, p. 615, pl. LXXIV, figs. 4–6; LXXX, figs. 1–4.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 504.—* CLESSIN, Conch. Cab. Ano., 1874, p. 128, pl. XLI, figs. 1, 2.—* PETEL, Conch. Sam., III, 1890, p. 184.
* *Margarita* (*Anodonta*) *sirionis* LEA, Syn., 1838, p. 31.
* *Anodon sirionis* CATLOW and REEVE, Conch. Nom., 1845, p. 68.
* *Margaron* (*Anodonta*) *sirionis* LEA, Syn., 1852, p. 51; 1870, p. 82.
* *Anodonta ferrarisii* D'ORBIGNY, Guer. Mag., 1835, p. 40.

Rio de la Plata

† GLABARIS PAZII Lea.

* *Anodonta pazii* LEA, Pr. Ac. N. Sci. Phila., X, 1866, p. 35; * Jl. Ac. N. Sci. Phila., VI, 1868, p. 274, pl. XXXVI, fig. 87; * Obs., XII, 1869, pl. XXXVI, fig. 87.—* CLESSIN, Conch. Cab. Ano., 1874, p. 139, pl. XLIII, figs. 3, 4.—* PÆTEL, Conch. Sam., III, 1890, p. 183.
* *Margaron* (*Anodonta*) *pazii* LEA, Syn., 1870, p. 81.

South America.

† GLABARIS RUBICUNDUS Lea.

* *Anodonta rubicunda* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 92; * Jl. Ac. N. Sci. Phila., V, 1863, p. 392, pl. XLVI, fig. 299; * Obs., X, 1863, p. 28, pl. XLVI, fig. 299.—* CLESSIN, Conch. Cab. Ano., 1876, p. 106, pl. XXXII, figs. 5, 6.—* PÆTEL, Conch. Sam., III, 1890, p. 184.
* *Anodon rubicundus* SOWERBY, Conch. Icon., XVII, 1870, pl. XXX, fig. 118.
* *Margaron* (*Anodonta*) *rubicunda* LEA, Syn., 1870, p. 75.

Uruguay River, South America.

† GLABARIS ROTUNDUS Spix.

* *Anodon rotundus* SPIX, Test. Fluv. Bras., 1827, p. 28, pl. XX, figs. 2–4.
* *Anodon rotunda* KUSTER, Conch. Cab. Ano., 1853, p. 33, pl. VIII, fig. 1.
* *Margaron* (*Anodonta*) *rotunda* LEA, Syn., 1870, p. 81.
* *Glabaris rotunda* VON IHERING, Arch. für Nat., 1893, p. 59.
* † *Anodonta cailliaudii* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 308; * Jl. Ac. N. Sci. Phila., V, 1863, p. 395, pl. XLV, fig. 297; * Obs., X, 1863, p. 31, pl. XLV, fig. 297.—* CLESSIN, Conch. Cab. Ano., 1873, p. 105, pl. XXXII, figs. 3, 4.—* PÆTEL, Conch. Sam., III, 1890, p. 177.
* *Anodon cailliaudi* SOWERBY, Conch. Icon., XVII, 1867, pl. XII, fig. 38.
* *Margaron* (*Anodonta*) *cailliaudii* LEA, Syn., 1870, p. 81.

Brazil.

GLABARIS MEMBRANACEUS Maton.[1]

* *Mytilus membranaceus* MATON, Tr. Linn. Soc. Lond., 1811, p. 329, pl. XXIV, figs. 11, 12.

[1] It is difficult to tell what this is, but I believe it to be some species of *Glabaris*, from the fact that Maton says that the hinge is edentulous. The figure (11) plainly shows it to be destitute of radial beak sculpture, though the umbo is perfect. The specimens figured are evidently young.

**Margarita* (*Anodonta*) *membranacea* LEA, Syn., 1836, p. 22; 1838, p. 23.
**Margaron* (*Anodonta*) *membranacea* LEA, Syn., 1852, p. 34; 1870, p. 55.
* *Unio membranaceus* HANLEY, Test. Moll., 1842, p. 202.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 492.—* PÆTEL, Conch. Sam., III, 1890, p. 159.
* *Unio subtrapezius* PHILIPPI, Zeits. für Mal., IV, 1847, p. 96; *Abbild., III, 1848, p. 80, pl. v, fig. 3.—* KUSTER, Conch. Cab. Unio, 1862, p. 283, pl. XCV, fig. 4.

Rio de la Plata.

†GLABARIS IHERINGI Clessin.

**Anodonta iheringi* CLESSIN, Mal. Bl., V, 1882, p. 191, pl. IV, fig. 5.—* PÆTEL, Conch. Sam., III, 1890, p. 180.[1]

(Group of *Glabaris crispatus*.)

Shell elliptical obovate, slightly produced at the posterior base, and straight or very feebly incurved in front of it; epidermis fuscous or tawny, cloth-like behind, somewhat rayed by more or less incised lines in front, where it is wrinkled like dried paint, the wrinkles often being looped; nacre lurid, bluish, somewhat iridescent.

Animal unknown.

†GLABARIS CRISPATUS Bruguiere.

**Anodontites crispata* BRUGUIERE, Jl. de Hist. Nat., I, 1792, p. 131.
**Anodonta crispata* LAMARCK, An. sans Vert., VI, 1819, p. 86.[2]—* LEA, Obs., I, 1834, p. 205.—* HANLEY, Test. Moll., 1842, p. 217; * Biv. Shells, 1843, p. 217.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* PÆTEL, Conch. Sam., III, 1890, p. 178.
**Margarita* (*Anodonta*) *crispata* LEA, Syn., 1836, p. 48; 1838, p. 29.
**Anodon crispata* CATLOW and REEVE, Conch. Nom., 1845, p. 66.
**Margaron* (*Anodonta*) *crispata* LEA, Syn., 1852, p. 47; 1870, p. 75.
* *?Anodonta crispa* LAMARCK, Enc Meth., II, 1827, p. 147, pl. CCIII, fig. 3.
* †*Anodonta puberula* GOULD, U. S. Expl. Ex., XII, 1852, p. 434, figs. 548, 548*a*, 548*b*.[3]
**Anodon reticulatus* SOWERBY, Conch. Icon., XVII, 1867, pl. x, fig. 27.
**Margaron* (*Anodonta*) *reticulata* LEA, Syn., 1870, p. 80.
**Anodonta reticulata* PÆTEL, Conch. Sam., III, 1890, p. 184.

Widely distributed in tropical South America.

GLABARIS PHILIPPIANUS Simpson.[4]

**Anodonta subsinuata* PHILIPPI, Mal. Bl., XVI, 1869, p. 41.—* PFEIFFER, Nov. Conch., III, 1869, p. 487, pl. CV, figs. 7, 8.—* PÆTEL, Conch. Sam., III, 1890, p. 185.

Ucayali River, Peru.

[1] This species combines characters of the *Patagonicus* and *Tenebricosus* groups.
[2] Lamarck refers to Encyclopaedie Méthodique, pl. CCIII, figs. 3, 3*a*, 3*b*.
[3] According to Lea's note in pencil on the margin of this description the species = *crispata*. I think he is right.
[4] The name *subsinuata*, applied to this by Philippi, will have to be placed in the synonymy, as Sowerby used it previously for a *Glabaris* which he placed in *Anodonta*.

†GLABARIS NAPOENSIS Lea.

**Anodonta napoensis* LEA, Pr. Ac. N. Sci. Phila., XII, 1868, p. 162; *Jl. Ac. N. Sci. Phila., VI, 1868, p. 324, pl. LIII, fig. 137; *Obs., XII, 1869, p. 84, pl. LIII, fig. 137.—*CLESSIN, Conch. Cab. Ano., 1873, p. 116, pl. XXXIV, figs. 3, 4.—*PÆTEL, Conch. Sam., III, 1890, p. 182.

* *Margaron* (*Anodonta*) *napoensis* LEA, Syn., 1870, p. 80.

River Napo, Ecuador.

†GLABARIS TORTILIS Lea.

* *Anodonta tortilis* LEA, Tr. Am. Phil. Soc., X, 1852, p. 291, pl. XXVIII, fig. 54; *Obs., V, 1852, p. 47, pl. XXVIII, fig. 54.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* CLESSIN, Conch. Cab. Ano., 1875, p. 166, pl. LV, figs. 7, 8.—* PÆTEL, Conch. Sam., III, 1890, p. 185.

* *Margaron* (*Anodonta*) *tortilis* LEA, Syn., 1852, p. 47; 1870, p. 75.

* *Anodon tortilis* SOWERBY, Conch. Icon., XVII, 1870, pl. XXXVII, fig. 154.

Cartagena, Colombia.

†GLABARIS LUTEOLUS Lea.

* *Anodonta luteola* LEA, Pr. Ac. N. Sci. Phila., II, 1858, p. 118; Jl. Ac. N. Sci. Phila., IV, 1860, p. 267, pl. XLIII, fig. 147; *Obs., VII, 1860, p. 85, pl. XLIII, fig. 147.—* CLESSIN, Conch. Cab. Ano., 1874, p. 122, pl. XXXVII, figs. 1, 2.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 181.

* *Margaron* (*Anodonta*) *luteola* LEA, Syn., 1870, p. 83.

* *Anodon luteolus* SOWERBY, Conch. Icon., XVII, 1870, pl. XXXIII, fig. 132.

Isthmus of Darien; Nicaragua; Costa Rica.

†GLABARIS SCHOMBURGIANUS Sowerby.

* *Anodon schomburgianus* SOWERBY, Conch. Icon., XVII, 1870, pl. XXXIV, fig. 137.

* *Anodonta schomburgkiana* CLESSIN, Conch. Cab. Ano., 1876, p. 235, pl. LXXVII, fig 4.

British Guiana.

†GLABARIS STREBELII Lea.

* *Anodonta strebelii* LEA, Pr. Ac. N. Sci. Phila., XX, 1868, p. 150; *Jl. Ac. N. Sci. Phila., VII, 1868, p. 322, pl. LII, fig. 135; *Obs., XII, 1869, p. 82, pl. LII, fig. 135.—*CLESSIN, Conch. Cab. Ano., 1874, p. 138, pl. XLII, figs. 5, 6.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 185.

* *Margaron* (*Anodonta*) *strebelii* LEA, Syn., 1870, p. 79.

Mexico.

†GLABARIS CYLINDRACEUS Lea.

* *Margarita* (*Anodonta*) *cylindracea*, LEA, Syn., 1836, p. 54; 1838, p. 32.

* *Anodonta cylindracea* LEA, Tr. Am. Phil. Soc., VI, 1838, p. 45, pl. XIII, fig. 40; *Obs., II, 1838, p. 45, pl. XIII, fig. 40.—* TROSCHEL, Arch. für Nat., V, 1839, Pt. 2, p. 238.—* HANLEY, Test. Moll., 1842, p. 223; Biv. Shells, 1843, p. 223.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 263.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* CLESSIN, Conch. Cab. Ano., 1874, p. 161, pl. LIII, figs. 5, 6.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 178.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p 528.

* *Anodon cylindracea* CATLOW and REEVE, Conch. Nom., 1845, p. 66.—* SOWERBY, Conch. Icon., XVII, 1869, pl. XXIV, fig. 93.

* *Margaron* (*Anodonta*) *cylindracea* LEA, Syn., 1852, p. 51; 1870, p. 82.

Medellin River, Mexico.

†GLABARIS PUELCHANUS d'Orbigny.

* *Anodonta puelchana* D'ORBIGNY, Guer. Mag., 1835, p. 40; Voy. Am. Mer., 1843, p. 620, pl. LXXIX, figs. 7–9.—* CHENU, Ill. Conch., 1858, pl. III, figs. 7, 7*a*.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* STROBEL, Mal. Argent., 1874.—* CLESSIN, Conch. Cab. Ano., 1874, p. 130, pl. XLI, figs. 5, 6.—* PÆTEL, Conch. Sam., III, 1890, p. 183.

* *Margaron* (*Anodonta*) *puelchana* LEA, Syn., 1852, p. 51; 1870, p. 81.

* *Anodonta obtusula* HUPE, Moll. Nouv., III, 1857, p. 87, pl. XVII, fig. 3.—* CLESSIN, Conch. Cab. Ano., 1875, p. 214, pl. LXVI, fig. 2.—* PÆTEL, Conch. Sam., III, 1890, p. 182.

* *Anodon obtusula* SOWERBY, Conch. Icon., XVII, 1868, pl. XX, fig. 81.

* *Margaron* (*Anodonta*) *obtusula* LEA, Syn., 1870, p. 79.

* *Glabaris obtusula* VON IHERING, Arch. für Nat., 1893, p. 119.

Patagonia, north to the Amazon; west to Bolivia.

†GLABARIS LIMNOICUS d'Orbigny.

* *Anodonta limnoica*, D'ORBIGNY, Guer. Mag., 1835, p. 40.—* HANLEY, Test. Moll., 1842, p. 218.—* D'ORBIGNY, Voy. Am. Mer., 1843, p. 619, pl. LXXIX, figs. 1–3.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 502.—* CLESSIN, Conch. Cab. Ano., 1874, p. 129, pl. XLI, figs. 3, 4.—* PÆTEL, Conch. Sam., III, 1890, p. 181.

* *Anodon limnoica* CATLOW and REEVE, Conch. Nom., 1845, p. 67.

* *Margarita* (*Anodonta*) *limnoica* LEA, Syn., 1838, p. 30.

* *Margaron* (*Anodonta*) *limnoica* LEA, Syn., 1852, p. 50; 1870, p. 79.

* *Anodonta lymnoica* CHENU, Ill. Conch., 1858, pl. III, figs. 1, 1*a*, 1*b*.

Argentina.

GLABARIS LUCIDUS d'Orbigny.[1]

* *Anodonta lucida* D'ORBIGNY, Guer. Mag., 1835, p. 40; * Voy. Am. Mer., 1843, p. 620, pl. LXXIX, fig. 4–6.—* CHENU, Ill. Conch., 1858, pl. III, figs. 6, 6*a*, 6*b*.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* CLESSIN, Conch. Cab. Ano, 1875, p. 208, pl. LXIX, figs. 4, 5.—* PÆTEL, Conch. Sam., III, 1890, p. 181.

* *Margaron* (*Anodonta*) *lucida* LEA, Syn., 1852, p. 51; 1870, p. 82.

Uruguay.

GLABARIS INCARUM Philippi.

* *Anodonta incarum* PHILIPPI, Mal. Bl., XVI, 1869, p. 40.—* PFEIFFER, Nov. Conch., III, 1869, p. 488, pl. CV., figs. 9–11.—* PÆTEL, Conch. Sam., III, 1890, p. 180.[2]

Peru.

†GLABARIS HOLTONIS Lea.

* *Anodonta holtonis* LEA, Pr. Ac. N. Sci. Phila., I, 1857, p. 85; * Jl. Ac. N. Sci. Phila., III, 1857, p. 316, pl. XXXII, fig. 31; * Obs., VI, 1847, p. 36, pl. XXXII, fig. 31.—* CLESSIN, Conch. Cab. Ano., 1874, p. 149, pl. L., figs. 5, 6.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 180.

* *Anodon holtonis* SOWERBY, Conch. Icon., XVII, 1870, pl. XXXVI, fig. 147.

* *Margaron* (*Anodonta*) *holtonis* LEA, Syn., 1870, p. 79.

Colombia.

[1] It is not unlikely that this and the two preceding species are variations of one thing.

[2] Probably a form of *G. puelchanus* d'Orbigny.

(Group of *Glabaris inæquivalvis*.)

Shell elliptical, moderately solid and inflated, with a low posterior ridge, slightly produced behind near the base and truncated above the posterior slope; beaks full, smooth; ligament imbedded in a sort of groove which extends to the anterior point of the shell; epidermis slightly roughened, often clothlike and showing the rest periods, having faint radiating lines; nacre bluish, soft, but not brilliant.

Animal unknown.

†GLABARIS INÆQUIVALVIS Lea.

**Anodonta inæquivalvis* LEA, Pr. Ac. N. Sci. Phila., XII, 1868, p. 95; *Jl. Ac. N. Sci. Phila., VI, 1868, p. 292, pl. XLIII, fig. 108; *Obs., XII, 1869, p. 52, pl. XLIII, fig. 108.—*CLESSIN, Conch. Cab. Ano., 1874, p. 137, pl. XLIV, figs. 7, 8.—*B. H. WRIGHT, Check List, 1888.

**Margaron* (*Anodonta*) *inæquivalvis* LEA, Syn., 1870, p. 83.

*†*Anodonta lenticularis* LEA, Pr. Ac. N. Sci. Phila., XII, 1868, p. 95; *Jl. Ac. N. Sci. Phila., VI, 1868, p. 290, pl. XLI, fig. 102; *Obs., XII, 1869, p. 50, pl. XLI, fig. 102.—*CLESSIN, Conch. Cab. Ano., 1874, p. 134, pl. XLIII, figs. 5, 6.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 181.

**Margaron* (*Anodonta*) *lenticularis* LEA, Syn., 1870, p. 81.

**Anodon glabrus* SOWERBY, Conch. Icon., XVII, 1870, pl. XXV, fig. 97.

**Anodon montezianus* SOWERBY, Conch. Icon., XVII, 1870, pl. XXXVI, fig. 145.

**Anodonta viridana* CLESSIN, Conch. Cab. Ano., 1876, p. 226, pl. LXXV, fig. 5.—*PÆTEL, Conch. Sam., III, 1890, p. 186.—*FISCHER and CROSSE, Miss. Sci. Pt. 7, II, 1894, p. 521.

Lake Nicaragua; Mexico.

†GLABARIS GRANADENSIS Lea.

**Anodonta granadensis* LEA, Pr. Ac. N. Sci. Phila., XII, 1868, p. 96; *Jl. Ac. N. Sci. Phila., VI, 1868, p. 288, pl. XLI, fig. 100; *Obs., XII, 1869, p. 48, pl. XLI, fig. 100.—*CLESSIN, Conch. Cab. Ano., 1874, p. 134, pl. XLIV, figs. 3, 4.—*B. H. WRIGHT, Check List, 1888.—*PÆTEL, Conch. Sam., III, 1890, p. 180.

**Margaron* (*Anodonta*) *granadensis* LEA, Syn., 1870, p. 81.

Lake Nicaragua, Central America.

†GLABARIS TRAUTWINIANUS Lea.

**Anodonta trautwiniana* LEA, Tr. Am. Phil. Soc., X, 1852, p. 287, pl. XXVI, fig. 48; *Obs., V, 1852, p. 43, pl. XXVI, fig. 48.

**Margaron* (*Anodonta*) *trautwiniana* LEA, Syn., 1870, p. 81.

**Anodon trautwinianus* SOWERBY, Conch. Icon., XVII, 1870, pl. XXXIII, fig. 134.

**Margaron* (*Anodonta*) *troutwiniana* LEA, Syn., 1852, p. 51.

**Anodonta troutwiniana* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—*CLESSIN, Conch. Cab. Ano., 1874, p. 112, pl. XXXVI, figs. 1, 2.—*PÆTEL, Conch. Sam., III, 1890, p. 186.

*? *Anodon ovatus* SWAINSON, Ex. Conch., 1841, pl. XXXVI.

? *Anodonta carthagena* ——, Who? Where?

Cartagena, Colombia.

GLABARIS MONTEZUMA Lea.[1]

**Anodonta montezuma* LEA, Pr. Am. Phil. Soc., II, 1841, p. 31; *Tr. Am. Phil. Soc., 1842, p. 240, pl. XXIII, fig. 55; *Obs., III, 1842, p. 78, pl. XXIII, fig. 55.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 504.—*CLESSIN, Conch. Cab. Ano., 1876, p. 220, pl. LXXII, figs. 7, 8.—*B. H. WRIGHT, Check List, 1888.—*P.ETEL, Conch. Sam., III, 1890, p. 182.

* *Margaron* (*Anodonta*) *montezuma* LEA, Syn., 1852, p. 51; 1870, p. 82.

Central America.

(Group of *Glabaris trapesialis*.)

Shell large, inflated, elliptical, narrower in front, with full, rather prominent beaks, a slight wing on the post dorsal part, and sometimes a small one in front of the beaks; epidermis smooth, generally uniform olive green; hinge line straight or slightly sinuous; escutcheon large and conspicuous; nacre bluish silvery, sometimes marked with parallel, wavy, dark lines.

Animal with the marsupium filling the inner branchiæ; gills large, inner the larger; palpi very large, reniform; mantle thin, with a wide, thickened edge; branchial opening small, plicate, but not crenulate or papillose; anal opening large, smooth, separated from the branchial by a strong bridge.

†GLABARIS TRAPESIALIS Lamarck.

**Anodonta trapesialis* LAMARCK, An. sans. Vert., VI, 1819, p. 87.

**Iridina trapesialis* D'ORBIGNY, Guer. Mag., 1835, p. 43[2].

* *Glabaris trapesialis* PILSBY, Pr. Ac. N. Sci. Phila., 1896, p. 563.

* *Anodonta trapezialis* BLAINVILLE, Man. de Mal. et Conch., 1825, p. 538, fig. 1.—*DESHAYES, Enc. Meth., II, 1827, p. 147, pl. CCV, fig. 1.—*WYATT, Man. Conch., 1838, p. 68, pl. XI, fig. 3.—*HANLEY, Test. Moll., 1842, p. 220; *Biv. Shells, 1843, p. 220.—*KUSTER, Conch. Cab. Ano., 1853, p. 31, pl. VII, fig. 4.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 504.—*CLESSIN, Conch Cab. Ano., 1876, p. 235, pl. LXXVII, fig. 5.

* *Anodon trapezialis* CROUCH, Ill. Int. Lam., 1827, p. 16, pl. IX, fig. 7.—*CATLOW and REEVE, Conch. Nom., 1845, p. 68.

* *Margarita* (*Anodonta*) *trapezialis* LEA, Syn., 1836, p. 53; 1838, p. 31.

* *Margaron* (*Anodonta*) *trapezialis* LEA, Syn., 1852, p. 52; 1870, p. 82.

* *Columba trapezialis* P.ETEL, Conch. Sam., III, 1890, p. 188.

* *Anodon giganteus* SPIX (part), Test. Fluv. Bras., 1827, p. 27, pl. XIX, fig. 2.

* *Anodon gigantea* SOWERBY, Conch. Icon., XVII, 1867, pl. VIII, fig. 18.

* *Anodonta gigantea* VON MARTENS, Mal. Bl., XV, 1868, p. 196.

* *Columba gigantea* P.ETEL, Conch. Sam., III, 1890, p. 188.

* † *Anodon penicillatus* GRAY,[3] Pr. Zool. Soc. Lond., 1834, p. 57.—*MÖLLER, Syn. Nov. Gen., 1836, p. 195.

[1] I have never seen this shell, and can not be positive from the figure and description whether it is a *Glabaris* or an *Anodonta*. I incline to think it the former, and that it belongs in this group.

[2] = *Anodontites trapesialis* Lamarck according to d'Orbigny in above, but in Voy. Am. Mer. he says it is not that.

[3] I have never seen this shell. Dr. Lea believes it to = *trapesialis* Lamarck.

**Anodonta penicillata* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—*PÆTEL, Conch. Sam., III, 1890, p. 183.

**Anodon susannæ* GRAY in Griffith, Cuv., XII, 1834, pl. XXIV, fig. 1.[1]—*SOWERBY, Conch. Icon., XVII, 1867, pl. IX, fig. 21.

**Anodonta susannæ* PÆTEL, Conch. Sam., III, 1890, p. 185.

*† *Anodon ciconia* GOULD, Pr. Bost. Soc. Nat. Hist., IV, 1851, p. 92.[2]—*?GOULD and CARPENTER, Pr. Zool. Soc. Lond., 1856, p. 202.—*OTIA, Conch., 1862, p. 213.—*PÆTEL, Conch. Sam., III, 1890, p. 177.—*?FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 534, pl. LXVIII, figs. 2, 2a.

**Anodon blainvilleana* SOWERBY, Conch. Icon., XVII, 1867, pl. VI, fig. 2.

† GLABARIS TRAPESIALIS var. ANSERINUS Spix.[3]

**Anodon anserinus* SPIX, Test. Fluv. Bras., 1827, p. 29, pl. XVII, figs. 1, 2.—*SOWERBY, Conch. Icon., XVII, 1870, pl. XXXI, fig. 125.

**Anodon anserina* CATLOW and REEVE, Conch. Nom., 1845, p. 66.

**Margarita* (*Anodonta*) *anserina* LEA, Syn., 1838, p. 31.

**Anodonta anserina* HANLEY, Test. Moll., 1842, p. 222; * Biv. Shells, 1843, p. 222.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 504.—*CHENU, Man., 1859, II, p. 146.—* CLESSIN, Conch. Cab. Ano., 1873, p. 80, pl. XX, fig. 1.—* PÆTEL, Conch. Sam., III, 1890, p. 176.

**Margaron* (*Anodonta*) *anserina* LEA, Syn., 1852, p. 52; 1870, p. 83.

† GLABARIS TRAPESIALIS var. EXOTICUS Lamarck.

**Anodonta exoticus* LAMARCK, An. sans Vert., VI, 1819, p. 87.—* STARK, Nat. Hist., II, 1828, p. 89.—*DELESSERT, Rec. Coq. Lam., 1841, pl. XIII, fig. 1.—*HANLEY, Test. Moll., 1842, p. 217; *Biv. Shells, 1843, p. 217.—*D'ORBIGNY, Voy, Am. Mer., 1843, p. 621.—*CHENU, Ill. Conch., 1858, pl. III, fig. 2.—*VON MARTENS, Mal. Bl., XV, 1868, p. 197.—*STROBEL, Mat. Mal., Pt. 1, 1874, p. 66.—*CLESSIN, Conch. Cab. Ano., 1875, p. 178, pl. LVIII, figs. 1, 2.

**Anadon exotica* CATLOW and REEVE, Conch. Nom., 1845, p. 66.

**Columba exotica* PÆTEL, Conch. Sam., III, 1890, p. 188.

† GLABARIS TRAPESIALIS var. SCRIPTUS Sowerby.

**Anodon scriptus* SOWERBY, Conch. Icon., XVII, 1867, pl. IV, fig. 9.[4]

* *Anodon subsinuatus* SOWERBY, Conch. Icon., XVII, 1867, pl. VII, fig. 14.

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[1] This is briefly described in the index, p. 595, as *Anodon susannæ*. In the text the genus is called *Anodontites*.

[2] Two specimens of this, a large and a smaller one, are in the Gould collection. Lea places the species in the synonymy of *G. trapesialis* Lamarck., to which Lewis objects in a note on the back of Gould's label on account of its locality—Mexico. After carefully comparing these shells with all our *trapesialis* in the Museum collections I am unable to separate the two. Carpenter states (Mazatlan Shells, p. 117) that it is found rather plentifully at Mazatlan. I do not believe that the locality given for Gould's shells is correct (it is referred to Mexico with doubt by its author), and have no doubt that they are from South America. The species alluded to by Carpenter is probably *G. glauca* Valenciennes, which is closely related to *G. trapesialis*.

[3] *Glabaris trapesialis* is a very abundant, widely distributed species, and shows a great number of variations. Some of these are probably worthy of varietal names, others seem to be so mixed with various forms that they are scarcely worthy of any designation.

[4] A brownish, somewhat elongated form, much narrowed in front, receiving its name from having dark purplish letter-like marks on the nacre. There is every possible development of this character from shells in which it is a marked feature to those without it at all.

* *Anodon subsinuatus* SOWERBY, Conch. Icon., XVII, 1867, pl. VIII, fig. 15.
* *Anodon areolatus* SOWERBY, Conch. Icon., XVII, 1867, pl. X, fig. 28.
* *Anodonta bahiensis* KUSTER, Conch. Cab. Ano., 1873, p. 94, pl. XX, fig. 2.—* PÆTEL, Conch. Sam., III, 1890, p. 176.
* *Glabaris bahiensis* VON IHERING, Arch. für Naturg., 1893, p. 115.

GLABARIS TRAPESIALIS var. MORETONIANUS Sowerby.

* *Anodon moretonianus* SOWERBY, Conch. Icon., XVII, 1867, pl. IX, fig. 20.

† GLABARIS TRAPESIALIS var. RIOPLATENSIS Sowerby.

* *Anodon rioplatensis* SOWERBY, Conch. Icon., XVII, 1870, pl. XXVI, fig. 101.
* *Anodonta rioplatensis* CLESSIN, Conch. Cab. Ano., 1875, p. 217, pl. LXIV, fig. 3.—* PÆTEL, Conch. Sam., III, 1890, p. 184.
* ? *Anodon ciconia* SOWERBY, Conch. Icon., XVII, 1870, pl. XXIX, fig. 115 *a*.

† GLABARIS TRAPESIALIS var. CYGNÆFORMIS Pilsbry.

* *Glabaris trapesialis* var. *cygnæformis* PILSBRY, Pr. Ac. N. Sci. Phila., 1896, p. 563, pl. XXVI, fig. 4, 5.

Tropical South America from Brazil and Peru southward.

† GLABARIS RADIATUS Spix.[1]

* *Anodon radiatus* SPIX, Test. Fluv. Bras., 1827, p. 31, pl. XXIII, fig. 1.
* *Margaron* (*Anodonta*) *radiatus* LEA, Syn., 1870, p. 83.
* *Margarita* (*Anodonta*) *radiata* LEA, Syn., 1836, p. 51.
* *Anodon radiata* CATLOW and REEVE, Conch. Nom., 1845, p. 67.
* *Glabaris radiata* VON IHERING, Arch. für Nat., 1893, p. 115.

Brazil.

† GLABARIS SIMPSONIANUS Pilsbry.

* *Glabaris simpsonianus* PILSBRY, Pr. Ac. N. Sci. Phila., 1896, p. 564, pl. XXVII, fig. 13.

Rio de la Plata.

GLABARIS HERTWIGII von Ihering.

* *Anodonta hertwigii* VON IHERING, Arch. für Nat., 1890, p. 150, pl. IX, fig. 7.

† GLABARIS SINUOSUS Lamarck.

* *Anodonta sinuosa* LAMARCK, An. sans Vert., VI, 1819, p. 87.—* DESHAYES, Enc. Meth., II, 1827, p. 147, pl. CCIII, fig. 2.—* HANLEY, Test. Moll., 1842, p. 224; * Biv. Shells, 1843, p. 224, Pt. 24, fig. 16.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* PÆTEL, Conch. Sam., III, 1890, p. 184.
* *Margarita* (*Anodonta*) *sinuosa* LEA, Syn., 1836, p. 54; 1838, p. 32.
* *Anodon sinuosa* CATLOW and REEVE, Conch. Nom., 1845, p. 68.
* *Margaron* (*Anodonta*) *sinuosa* LEA, Syn., 1852, p. 53; 1870, p. 83.
* *Anodon sinuosus* SWAINSON, Ex. Conch., 2d ed., 1841, p. 29, pl. XVI.

Brazil.

[1] The specimen figured is a young shell, somewhat narrowed at the posterior end, and quite full at the central base, with broad, faint rays. It may be only a variety of *trapesialis*.

GLABARIS GRIJALVÆ Morelet.

* *Anodonta grijalvæ* MORELET, Jl. de Conch., XXXI, 1884, p. 12.—* PÆTEL, Conch. Sam., III, 1890, p. 180.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 532, pl. LXIX, figs. 1, 1*a*.

* *Anodonta grijoloæ* PÆTEL, Conch. Sam., III, 1890, p. 180.[1]

Tabasco, Mexico.

†GLABARIS GLAUCUS Valenciennes.

* *Anodonta glauca* VALENCIENNES, Rec. Obs. Zool., II, 1833, p. 236, pl. L, fig. 2.—* FERUSSAC, Guer. Mag., 1835, p. 25.—* DESHAYES, An. sans Vert., 2d ed., VI, 1835, p. 569; 3d ed., II, 1839, p. 679.—* DELESSERT, Rec. Coq. Lam., 1841, pl. XIII, fig. 3.—* HANLEY, Test. Moll., 1842, p. 221; * Biv. Shells, 1843, p. 221.—* CONRAD, Pr. Ac. N. Sci. Phila., VI, 1853, p. 264.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 502.—* CLESSIN, Conch. Cab. Ano., 1876, p. 222, pl. LXXIII fig. 1.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III. 1890, p. 180.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 533, pl. LXIX, figs. 1, 1 *a*.

* *Margarita* (*Anodonta*) *glauca* LEA, Syn., 1836, p. 51; 1838, p. 30.

* *Anodon glauca* CATLOW and REEVE, Conch. Nom., 1845, p. 67.—* GOULD, Pr. Bost. Soc. N. Hist., III, 1850, p. 293.

* *Margaron* (*Anodonta*) *glauca* LEA, Syn., 1852, p. 50; 1870, p. 80.

* *Monocondylæa glauca* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 501.—* PÆTEL, Conch. Sam., III, 1890, p. 174.

* *Anodon glaucus* SOWERBY, Conch. Icon., XVII, 1870, pl. XXVII, fig. 105.

* ? *Anodonta ciconia* GOULD, Pr. Bost. Soc. N. Hist. IV, 1851, p. 92.—CARPENTER, Maz. Shells, 1857, p. 117.—* ? FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 534, pl. LXVIII, figs. 2, 2*a*.

* *Anodonta burroughiana* CHENU (part), Ill. Conch., 1858, pl. III.

GLABARIS GLAUCUS var. SINALOENSIS Crosse and Fischer.

* *Anodonta glauca* VALENCIENNES, var. *sinaloenses* CROSSE and FISCHER, Jl. de Conch., XXXI, 1883, p. 219.

Mexico, south to Peru and Brazil.

GLABARIS UMBONATUS Simpson.

Anodon ciconia SOWERBY (part), Conch. Icon., XVII, 1870, pl. XXIX, fig. 115*b*.[2]

Locality unknown.

†GLABARIS BRIDGESII Lea.

* *Anodonta bridgesii* LEA, Pr. Ac. N. Sci. Phila., XII, 1868, p. 95; * Jl. Ac. N. Sci. Phila., VI, 1868, p. 291, pl. XLII, fig. 104; * Obs., XII, 1869, p. 51, pl. XLII,

[1] The above atrocity, which is a sample of many names in Pætel, is no doubt intended for *G. grijalvæ*.

[2] Sowerby gives two figures of what he calls *ciconia*, 115*a* being most likely a young shell of some form of *trapesialis*, the other a totally different form, apparently a new species of *Glabaris* of the *trapesialis* group. As far as the figure shows it may be described as follows: Shell subquadrate with nearly straight dorsal and basal lines, biangulate behind, greatly inflated, with very full, high beaks which rise far above the dorsal line, winged and angulated at the front and hinder dorsal line; color olive-green. Length, 147 mm.; height, 92 mm.; elevation of beaks above dorsal line, 10 mm.

fig. 101.—* CLESSIN, Conch. Cab. Ano., 1874, p. 136, pl. XLV, figs. 1, 2.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 177.

* *Margaron* (*Anodonta*) *bridgesii* LEA, Syn., 1870, p. 81.

Nicaragua; Honduras.

†GLABARIS JEWITTIANUS Lea.

* *Anodonta jewittiana* LEA, Pr. Ac. N. Sci. Phila., XII, 1868, p. 95.

* *Anodonta jewittii* LEA, Jl. Ac. N. Sci. Phila., VI, 1869, p. 289, pl. XLI, fig. 101; * Obs., XII, 1869, p. 49, pl. XLI, fig. 101.—* CLESSIN, Conch. Cab. Ano., 1874, p. 135, pl. XLIV, figs. 1, 2.—* B. H. WRIGHT, Check List, 1888.—* PÆTEL, Conch. Sam., III, 1890, p. 180.

* *Margaron* (*Anodonta*) *jewittii* LEA, Syn., 1870, p. 81.

Lake Nicaragua.

†GLABARIS FORBESIANUS Lea.

* *Anodonta forbesiana* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 92; * Jl. Ac. N. Sci. Phila., V, 1863, p. 393, pl. XLVII, fig. 301; * Obs., X, 1863, p. 29, pl. XLVII, fig. 301.—* CLESSIN, Conch. Cab. Ano., 1873, p. 115, pl. XXXIV, figs. 1, 2.—* PÆTEL, Conch. Sam., III, 1890, p. 179.

* *Anodon forbesianus* SOWERBY, Conch. Icon., XVII, 1870, pl. XXX, fig. 119.

* *Margaron* (*Anodon'a*) *forbesiana* LEA, Syn., 1870, p. 81.

Uruguay; Peru.

†GLABARIS MORICANDII Lea.

* *Anodonta moricandii* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 90; * Jl. Ac. N. Sci. Phila., V, 1863, p. 396, pl. XLIX, fig. 303; Obs., X, 1863, p. 32, pl. XLIX, fig. 303.—* CLESSIN, Conch. Cab. Ano., 1874, p. 114, pl. XXXVIII, figs. 3, 4.—* PÆTEL, Conch. Sam., III, 1890, p. 182.

* *Anodon moricandii* SOWERBY, Conch. Icon., XVII, 1870, pl. XXXII, fig. 126.

* *Margaron* (*Anodonta*) *moricandii* LEA, Syn., 1870, p. 81.

* *Glabaris moricandii* VON IHERING, Arch. für Nat., 1893, p. 115.

* ? *Anodonta exotica* SOWERBY, Conch. Icon., XVII, 1867, pl. XVI, fig. 57.

* *Anodonta angustata* CLESSIN,[1] Conch. Cab. Ano., 1876, p. 226, pl. LXXIV, figs. 6, 7.—* PÆTEL, Conch. Sam., III, 1890, p. 176.

Brazil.

(Group of *Glabaris georginæ*.)

Shell subsolid, obovate, with a decided, curved posterior ridge, and a smaller one above it, the space between the ridges a shallow groove.

GLABARIS GEORGINÆ Griffith.

* *Anodonta georginæ* GRIFFITH, Griff. Cuvier, XII, 1834, pl. XIX. Brief description in index.

Rivers of Paraguay.

(Group of *Glabaris trigonus*.)

Shell long, elliptical, solid, inflated, produced at posterior base with smooth, shining epidermis; nacre very bright.

[1] Appears to be a very young *G. moricandii*.

†GLABARIS TRIGONUS Spix.

* *Anodon trigonus* SPIX, Test. Fluv. Bras., 1827, p. 29, pl. XXII, fig. 2.
* *Margarita* (*Anodonta*) *trigona* LEA, Syn., 1836, p. 51; 1838, p. 30.
* *Anodon trigona* CATLOW and REEVE, Conch. Nom., 1845, p. 68.
* *Anodonta trigona* HANLEY, Test. Moll., 1842, p. 218.—* D'ORBIGNY, Voy. Am. Mer., 1843, p. 618.—* KUSTER, Conch. Cab. Ano., 1853, p. 9, pl. II, fig. 5.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* PÆTEL, Conch. Sam., III, 1890, p. 186.
* *Margaron* (*Anodonta*) *trigona* LEA, Syn., 1852, p. 50; 1870, p. 75.
* *Anodon chiquetana* D'ORBIGNY, Guer. Mag., 1835, p. 41.
* *Anodonta chiquetana* PÆTEL, Conch. Sam., III, 1890, p. 177.
* *Anodonta castelnandi* HUPE, Moll. Nouv., III, 1857, p. 88, pl. XVIII, fig. 4.—* PÆTEL, Conch. Sam., III, 1890, p. 177.
* *Anodonta subrostrata* PHILIPPI, Mal. Bl., XVI, 1869, p. 39.—* PFEIFFER, Nov. Conch., III, 1869, p. 486, pl. CV, figs. 1–3.—* PÆTEL, Conch. Sam., III, 1890, p. 185.
* *Anodonta ucayalensis* PHILIPPI, Mal. Bl., XVI, 1869, p. 40.—* PFEIFFER, Nov. Conch., III, 1869, p. 486, pl. CV, figs. 4–6.—* PÆTEL, Conch. Sam., III, 1890, p. 186.

Brazil; Ecuador; Peru; Bolivia.

†GLABARIS AMAZONENSIS Lea.

* *Anodonta amazonensis* LEA, Pr. Ac. N. Sci. Phila., IV, 1860, p. 89; * Jl. Ac. N. Sci. Phila., V, 1863, p. 395, pl. XLVI, fig. 300; * Obs., X, 1863, p. 31, pl. XLVI, fig. 300.—* CLESSIN, Conch. Cab. Ano., 1874, p. 119, pl. XXXVII, fig. 7.—* PÆTEL, Conch. Sam., III, 1890, p. 176.
* *Anodon amazonensis* SOWERBY, Conch. Icon., XVII, 1870, pl. XXX, fig. 120.
* *Margaron* (*Anodonta*) *amazonensis* LEA, Syn., 1870, p. 82.

Amazon.

GLABARIS WEDDELLII Hupe.

* *Anodonta weddellii* HUPE, Moll. Nouv., III, 1857, p. 87, pl. XVII, fig. 5.—* CLESSIN, Conch. Cab. Ano., 1876, p. 214, pl. LXVI, fig. 1.—* PÆTEL, Conch. Sam., III, 1890, p. 186.
* *Anodon weddellii* SOWERBY, Conch. Icon., XVII, 1868, pl. XX, fig. 80.
* *Margaron* (*Anodonta*) *weddellii* LEA, Syn., 1870, p. 79.

Brazil.

†GLABARIS ELONGATUS Swainson.

* *Anodon elongatus* SWAINSON, Zool. Ill., 1st Ser., III, pl. CLXXVI, 1823.
* *Margarita* (*Anodonta*) *elongata* LEA, Syn., 1836, p. 53; 1838, p. 32.
* *Anodonta elongata* HANLEY, Test. Moll., 1842, p. 223; * Biv. Shells, 1843, p. 223.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.
* *Anodon elongata* CATLOW and REEVE, Conch. Nom., 1845, p. 66.
* *Anodonta solidula* DEVILLE and HUPE, Rev. et Mag. Zool., 1850, p. 644, pl. XVI, fig. 2.—* HUPE, Moll. Nouv., III, 1857, p. 88, pl. XVIII, fig. 2.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—CLESSIN, Conch. Cab. Ano., 1876, p. 221, pl. LXXIII, fig. 2.—* PÆTEL, Conch. Sam., III, 1890, p. 185.
* *Margaron* (*Anodonta*) *solidula* LEA, Syn., 1852, p. 53; 1870, p. 83.
* *Anodon solidula* SOWERBY, Conch. Icon., XVII, 1869, pl. XXIII, fig. 91.
† * *Anodonta wheatleyi* LEA, Tr. Am. Phil. Soc., X, 1852, p. 287, pl. XXVI, fig. 49; * Obs., V, 1852, p. 43, pl. XXVI, fig. 49.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* CLESSIN, Conch. Cab. Ano., 1874, p. 113, pl. XXXVI, figs. 3, 4.—* PÆTEL, Conch. Sam., III, 1890, p. 186.
* *Margaron* (*Anodonta*) *wheatleyi* LEA, Syn., 1852, p. 51; 1870, p. 82.

* *Anodon amethystus* SOWERBY, Conch. Icon., XVII, 1869, pl. XXIV, figs. 95, 95*a*, 95*b*.[1]
* *Anodonta amethysta* CLESSIN, Conch. Cab. Ano., 1875, p. 180, pl. LX, fig. 3.
* *Anodon dactylus* SOWERBY, Conch. Icon., XVII, 1867, pl. XIX, fig. 75.
* *Anodonta dactylus* CLESSIN, Conch. Cab., 1875, p. 175, pl. LVII, fig. 3.—PÆTEL, Conch. Sam., III, 1890, p. 178.
Margaron (*Anodonta*) *dactylus* LEA, Syn., 1870, p. 80.

GLABARIS LINGULATUS Hupe.

* *Anodonta lingulata* HUPE, Moll. Nouv., III, 1857, p. 89.—* CLESSIN, Conch. Cab. Ano., 1875, p. 215, pl. LXVI, fig. 3.—* PÆTEL, Conch. Sam., III, 1890, p. 181.
* *Anodon lingulata* SOWERBY, Conch. Icon., XVII, 1869, pl. XXIII, fig. 90.
* *Margaron* (*Anodonta*) *lingulata* LEA, Syn., 1870, p. 79.
* *Glabaris lingulata* VON IHERING, Arch. für Nat., 1893, p. 119.

Paraguay.

†GLABARIS MORTONIANUS Lea.

* *Anodonta mortoniana* LEA, Tr. Am. Phil. Soc., V, 1834, p. 80, pl. XIII, fig. 37; *Obs., I, 1834, p. 192, pl. XIII, fig. 37.—* HANLEY, Test. Moll., 1842, p. 219.—*H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 502.—* CLESSIN, Conch. Cab. Ano., 1874, p. 151, pl. XLVIII, figs. 5, 6.—* PÆTEL, Conch. Sam., III, 1890, p. 182.
* *Margarita* (*Anodonta*) *mortoniana* LEA, Syn., 1838, p. 30.
* *Anodon mortoniana* CATLOW and REEVE, Conch. Nom., 1845, p. 67.
* *Margaron* (*Anodonta*) *mortoniana* LEA, Syn., 1852, p. 150; 1800, p. 80.

Parana River, South America.

GLABARIS LONGINUS Spix.

* *Anodon longinus* SPIX, Test. Fluv. Bras, 1827, p. 29, pl. XXII, fig 1.
* *Mycetopus longinus* CLESSIN, Conch. Cab. Ano., 1875, p. 202.—* FISCHER, Jl. de Conch., XXXVIII, 1890, p. 8.
* *Iridina longina* LEA, Syn., 1836, p. 57.
* *Anodonta longina* KUSTER, Conch. Cab. Ano., 1853, p. 7, pl. II, fig. 1.—* PÆTEL, Conch. Sam., III, 1890, p. 181.

Brazil; Amazon.

GLABARIS LEOTANDI Guppy.[2]

* *Anodonta leotandi* GUPPY, Ann. and Mag., XIV, 1864, p. 243;* XVII, 1866, p. 54; Pr. Sci. Assn. Trinidad, 1872, p. —; *Jl. Conch., VII, 1894, p. 229.
* *Anodonta leotandi* B. H. WRIGHT, Check List, 1888.
* *Margaron* (*Anodonta*) *leotandi* LEA, Syn., 1870, p. 83.

Trinidad Island, West Indies.

Section STYGANODON von Martens, 1900.

(Type, *Anodonta tenebricosa* Lea.)

Shell subrhomboid, with a thick, dark, rather rough, sombre-colored epidermis, which is sometimes faintly rayed, nacre lurid, shaded green; animal unknown.

(Group of *Glabaris tenebricosus*.)

Shell elongate, slightly inflated; base incurved.

[1] Changed to *wheatleyi* Lea, by Sowerby in index.
[2] I am not certain where this groups, as I have never seen the shell, and it has not been figured.

†GLABARIS TENEBRICOSUS Lea.

**Anodonta tenebricosa* LEA, Tr. Am. Phil. Soc., V, 1834, p. 78, pl. XII, fig. 36; * Obs., I, 1834, p. 190, pl. XII, fig. 36.—* D'ORBIGNY, Guer. Mag., 1835, p. 39.—* HANLEY, Test. Moll., 1842, p. 224.—* D'ORBIGNY, Voy. Am. Mer., 1843, p. 616.—* Hanley, Biv. Shells, 1856, p. 224.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* CHENU, Man., 1859, p. 146, fig. 720.—* VON MARTENS, Mal. Bl., XV, 1868, p. 200.—* PÆTEL, Conch. Sam., III, 1890, p. 185.

* *Margarita* (*Anodonta*) *tenebricosa* LEA, Syn., 1836, p. 54; 1838, p. 32.

* *Anodon tenebricosa* CATLOW and REEVE, Conch. Nom., 1845, p. 68.—* SOWERBY, Conch. Icon., XVII, 1867, pl. XIII, fig. 43.

* *Margaron* (*Anodonta*) *tenebricosa* LEA, Syn., 1852, p. 53; 1870, p. 83.

* *Glabaris tenebricosa* VON IHERING, Arch. für Nat., 1893, p. 61.

* *Anodon tenebricosus* SOWERBY, Conch. Icon., XVII, 1870, pl. XXXI, fig. 123.

Brazil, Ecuador, Peru; south to Argentina.

GLABARIS PASTASANUS Clessin.

**Anodonta pastasana* CLESSIN, Mal. Bl. (2), I, 1879, p. 173, pl. XI, fig. 1.

Rio Pastasa, Ecuador.[1]

†GLABARIS SOLENIFORMIS d'Orbigny.

**Anodonta soleniformis* D'ORBIGNY, Guer. Mag., 1835, p. 41; * Voy. Am. Mer., 1843, p. 617, pl. LXXIV, figs. 1, 3.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* CLESSIN, Conch. Cab. Ano., 1873, p. 111, pl. XXVII, fig. 1.—* PÆTEL, Conch. Sam., III, 1890, p. 185.

* *Margarita* (*Anodonta*) *soleniformis* LEA, Syn., 1838, p. 32.

* *Margaron* (*Anodonta*) *soleniformis* LEA, Syn., 1852, p. 53; 1870, p. 83.

* *Glabaris soleniformis* VON IHERING, Arch. für. Nat., 1893, p. 59.

* *Anodon solenidea* SOWERBY, Conch. Icon., XVII, 1867, pl. XVIII, fig. 65.

* *Margaron* (*Anodonta*) *solenidea* LEA, Syn., 1870, p. 83.

Brazil, south into Argentina.

† GLABARIS CLESSINI Fischer.

* *Mycetopus plicatus* CLESSIN, Mal. Bl., V, 1882, p. 190, pl. IV, fig. 7.

* PÆTEL, Conch. Sam., III, 1890, p. 187.

* *Mycetopus clessini*, FISCHER,[2] Jl. de Conch., XXXVIII, 1890, p. 8, footnote.

* *Glabaris nehringi* VON IHERING, Arch. für Nat., 1893, p. 60.

Southern Brazil; southward into Argentina.

GLABARIS BAMBOUSEARUM Morelet.

**Anodon bambouscarum* MORELET, Test. Nov., II, 1851, p. 24.—* FISCHER and CROSSE, Miss. Sci., Pt. 7, II, 1894, p. 527, pl. LXIII, figs. 6, 6*a*.

Palenque in Chiapas, Mexico.

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[1] Probably only a variety of *tenebricosus*.

[2] Fischer changed the name *plicatus* to *clessini* because the former name had been used by Sowerby for a species which he (Sowerby) placed in *Mycetopus*. Sowerby's shell is a *Mutela*, and that of Clessin a *Glabaris* of the *Tenebricosus* group. Von Ihering applied the name *nehringi* to the above after Fischer had changed it, and was evidently not aware that the French savant had given it a new name.

†GLABARIS SCHRÖTERIANUS Lea.

* *Anodonta schröteriana* LEA, Tr. Am. Phil. Soc., XI, 1852, p. 292, pl. XXIX, fig. 55; * Obs., V, 1852, p. 48, pl. XXIX, fig. 55.—* HUPE, Moll. Nouv., III, 1857, p. 89, pl. XVIII, fig. 3.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* CLESSIN, Conch. Cab. Ano., 1874, p. 151, pl. XLVII, figs. 5, 6.—* PÆTEL, Conch. Sam., III, 1890, p. 184.

* *Margaron* (*Anodonta*) *schröteriana* LEA, Syn., 1852, p. 51; 1870, p. 82.

* *Anodon schröteriana* SOWERBY, Conch. Icon., XVII, 1868, pl. XX, fig. 74.

* *Margaritana schröteriana* PÆTEL, Conch. Sam., III, 1890, p. 173.

Amazon drainage.

(Group of *Glabaris obtusus*.)

Shell short, inflated, thin, feebly rayed, rays often broken; base rather full.

†GLABARIS OBTUSUS Spix.

* *Anodon obtusus* SPIX, Test. Fluv. Bras., 1827, p. 30, pl. XXII, fig. 3.

* *Margarita* (*Anodonta*) *obtusa* LEA, Syn., 1836, p. 52; 1838, p. 31.

* *Anodonta obtusa* HANLEY, Test. Moll., 1842, p. 221; Biv. Shells, 1843, p. 221.—* POTIEZ and MICHAUD, Gall. Moll., 1844, p. 144, pl. LV, fig. 3.—* KUSTER, Conch. Cab. Ano., 1853, p. 8, pl. II, figs. 3, 4.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 504.—* MUSGRAVE, Phot. Conch., 1863, pl. I, fig. 7.—* CLESSIN, Conch. Cab. Ano., 1875, p. 170, pl. LVI, figs. 1, 2.—* PÆTEL, Conch. Sam., III, 1890, p. 182.

* *Margaron* (*Anodonta*) *obtusa* LEA, Syn., 1852, p. 51; 1870, p. 82.

* *Anodon obtusa* CATLOW and REEVE, Conch. Nom., 1845, p. 67.—* SOWERBY, Conch. Icon., XVII, 1867, pl. XII, fig. 39.

* *Anodonta* VALENCIENNES, Coq. Mar. Biv., 1827 ?, pl. XLVIII, figs. 3*a*, 3*b*.[1]

Brazil; Paraguay.

†GLABARIS LITURATUS Spix.

* *Anodon obtusus* var. *b. lituratum* SPIX, Test. Fluv. Bras., 1827, p. 30, pl. XXII, fig. 4.

* *Anodonta litturata* HUPE, Moll. Nouv., 1857, p. 87, pl. XVII, fig. 4.[2]

* *Anodon liturata* SOWERBY, Conch. Icon., XVII, 1868, pl. XX, fig. 78.

Brazil.

Section VIRGULA Simpson, 1900.

(Type, *Glabaris ensiformis* Spix.)

Shell subsolid to solid, moderately inflated, greatly elongated, straight or falcate, rounded in front, sharply pointed at the posterior base, where the high, sharply defined posterior ridge ends and above which it is somewhat obliquely truncated; beaks not high; epidermis green to olive; nacre brilliant, bluish or purplish, iridescent, rayed with very fine, indistinct ridges; posterior end with a slight sinus.

Animal unknown.

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[1] Valenciennes gives no name or description with the above, but the figure is, no doubt, *G. obtusa*.

[2] Hupe is certain that this is different from *obtusus*, and says that the small angular marks on its surface are very distinct; that it is thinner and less inflated. I doubt whether it is more than a variety of *obtusus*.

† GLABARIS ENSIFORMIS Spix.

* *Anodon ensiformis* SPIX, Test. Fluv. Bras., 1827, p. 31, pl. XXIV, figs. 1, 2.—* CATLOW and REEVE, Conch. Nom., 1845, p. 66.—* SOWERBY, Conch. Icon., XVII, 1867, pl. XI, fig. 31.

* *Iridina ensiformis* LEA, Syn., 1836, p. 57.

* *Anodonta ensiformis* HANLEY, Test. Moll., 1842, p. 223; * Biv. Shells, 1843, p. 223.—* D'ORBIGNY, Voy. Am. Mer., 1843, p. 618, pl. LXXIX, fig. 10.—* KUSTER, Conch. Cab. Ano., 1853, p. 8, pl. II, fig. 12.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 503.—* ? CHENU, Man., 1859, II, p. 146, fig. 721.—* PÆTEL, Conch. Sam., III, 1890, p. 179.

* *Margarita* (*Anodonta*) *ensiformis* LEA, Syn., 1838, p. 32.

* *Margaron* (*Anodonta*) *ensiformis* LEA, Syn., 1852, p. 51; 1870, p. 82.

Tropical South America.[1]

† GLABARIS FALSUS Simpson.[2]

Yuruari River, a branch of the Orinoco.

† GLABARIS LEGUMEN von Martens.

* *Anodonta legumen* VON MARTENS, S. B. Nat. Fr., 1888, p. 65.

Southern Brazil.

The following are unfigured or indeterminate species of *Glabaris*.

* *Anodon brevis* SOWERBY, Conch. Icon., XVII, 1870, pl. XXXI, fig. 124.

La Plata, South America.[3]

* *Anodon porcifer* GRAY, Pr. Zool. Soc. Lond., 1834, p. 58.

Paraguay.

* *Unio* (*Anodontes*) *spixii* D'ORBIGNY, Guer. Mag., 1835, p. 39.[4]

Brazil.

* *Anodon cheeziana* SOWERBY, Conch. Icon., XVII, 1867, pl. XV, fig. 52.

Probably a *Glabaris*.

* *Anodonta nicaragua* PHILIPPI, Zeits. für Mal., V, 1848, p. 130.

Nicaragua.

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[1] The three very peculiar species of this section seem to show relationship with *G. wheatleyi* and *G. clessini*.

[2] Shell elongated, rather thin, subrhomboid and pointed at the posterior base, slightly rayed on the low, rounded posterior ridge; beaks low; epidermis olive green, somewhat cloth-like; hinge line nearly straight; anterior scars deep; escutcheon small, dark; nacre shaded bluish and greenish, lurid purplish in the center, iridescent behind. Length, 76 mm.; height, 21 mm.; diameter, 11 mm. This was supposed by Dr. Lea to be *ensiformis* and I thought it was that until a more careful examination convinced me of its distinctness. It is a smaller, thinner, more rhomboid sheil, and has a somewhat cloth-like epidermis, while that of *ensiformis* is smooth. I regret that I can not figure this species, and that I must describe it in a footnote, but I only discovered that it was a distinct species as the Synopsis was about ready for the press.

[3] I can not tell what this is. If it is a true *Glabaris*, it would be the type of a group perhaps near *G. tenebricosus*.

[4] D'Orbigny refers to figures in Spix, but his references are badly mixed up.

**Anodonta aperta* RAFINESQUE, Atl. Jl., No. 4, 1832, p. 134.

Parana River, South America.

**Anodonta atrorirens* PHILIPPI, Zeits. für Mal., V, 1848, p. 130.

**Anodonta carinata* DUNKER, Mal. Bl., V, 1858, p. 225.

Colombia.

**Anodonta cornea* PHILIPPI, Zeits. für Mal., V, 1848, p. 130.

Nicaragua.

**Anodonta giullaini* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 502. Credited to Recluz.

**Anodonta paphos* RAFINESQUE, Atl. Jl. and Friend., 1832, p. 134.

Parana River.

**Anodon pictus* SWAINSON, Ex. Conch., 2d ed., 1841, p. 39.

**Anodonta wallisi* MOUSSON, Mal. Bl., XVI, 1869, p. 188.

**Anodonta tehuantepecensis* FISCHER and CROSSE, Miss. Sci., 1894, p. 526.

Tehuantepec. Not yet figured.

**Anodonta hertwigi* VON IHERING.

Where?

**Anodonta bergi* VON IHERING.

Where?

Genus MYCETOPODA d'Orbigny, 1835.[1]

(Type, *Mycetopoda soleniformis* d'Orbigny.)

Mycetopoda D'ORBIGNY, Guer. Mag., No. 62, 1835, p. 41.
Mycetopus D'ORBIGNY, Voy. Am. Mer., 1847, p. 600.

Shell thin, elongated, truncate above behind, with a low, posterior ridge and rather flat, smooth or slightly concentrically wrinkled beaks; epidermis smooth, shining, pale greenish-yellow or brownish, rayless; hinge line long, straight, edentulous or showing faint traces of denticles, under a glass, beneath the nacre; nacre soft, bluish-white and iridescent; muscular impressions faint, irregular, the smaller anterior scar above the larger one; beak cavities shallow.

Animal having very long gills, the inner much the larger, united to the abdominal sac throughout their whole length; palpi large, round below, projecting very slightly behind and attached along the whole length of the straight upper border; mantle very thin, slightly thickened at the edges; branchial opening closed below into a short papillose siphon, and separated from the nearly smooth anal opening by a strong bridge; superanal opening not closed below; foot very long, developed at the lower end into a sort of head or button.

[1] So named by its author in the Guerin Magazine, but afterwards changed by him to *Mycetopus* in the Voyage Amerique Meridionale. The genus has been made the type of a separate family by Gill, and was so acknowledged by Pelseneer and others, but it does not seem to me to be separable from the *Mutelidæ*. Certain shells under favorable light show slight dentilations along the hinge line, which are, no doubt, vestigial taxodont teeth common to the family; the labial palpi and anal bridge are decidedly mutelid in character, and the great development of the foot is paralleled in *Solenaia*, *Lastena*, and to some extent by *Gonidea* among the *Unionidæ*.

(Group of *Mycetopoda siliquosa*.)

Beaks in front of the center of the shell; anterior end evenly rounded; basal lines nearly straight; posterior ridge quite low. Animal with the characters of the genus.

†MYCETOPODA SILIQUOSA Spix.

* *Anodon siliquosus* SPIX, Test. Fluv. Bras., 1827, p. 30, pl. XXIII, fig. 2.
* *Mycetopoda siliquosus* D'ORBIGNY, Guer. Mag., 1835, p. 41.
* *Mycetopus siliquosus* D'ORBIGNY, Voy. Am. Mer., 1843, p. 601, pl. LXVII.—* HANLEY, Test. Moll., 1842, p. 224; * Biv. Shells, 1843, p. 224.—* CATLOW and REEVE, Conch. Nom., 1845, p. 69.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 505; III, pl. CXVIII, fig. 1.—* SOWERBY, Conch. Icon., XVI, 1868, pl. I, fig. 2; III, fig. 2*a*.—* CLESSIN, Conch. Cab. Ano., 1875, p. 200, pl. LXVIII, figs. 2–4; LXIX, fig. 1.—* P.ETEL, Conch. Sam., III, 1890, p. 187.—* VON IHERING, Arch. für Nat., 1893, p. 56.
* *Platiris* (*Mycetopus*) *siliquosus* LEA, Syn., 1852, p. 56; 1870, p. 90.
* *Platiris* (*Iridina*) *siliquosa* LEA, Syn., 1836, p. 56; 1838, p. 34.
* *Anodonta siliquosa* KUSTER, Conch. Cab. Ano., 1853, p. 35, pl. VIII, fig. 3.
* *Mycetopoda siliquosa* CHENU, Ill. Conch., 1858, pl. I, figs. 2, 2*a*, 2*b*, 2*c*.

Bolivia, Brazil; south into Argentina.

*MYCETOPODA OCCIDENTALIS Clessin.[1]

Mycetopoda Occidentalis CLESSIN, Mal. Bl. I, 1879, p. 174, pl. XI, figs. 2, 3.—* P.ETEL, Conch. Sam., III, 1890, p. 187.—* FISCHER, Jl. de Conch., XXXVIII, 1890, p. 8.

Ecuador.

MYCETOPODA STAUDINGERI von Ihering.[2]

* *Mycetopus staudingeri* VON IHERING, Arch. für Naturg., 1890, p. 131, figs. A, B.

Upper Amazon in Ecuador and Peru.

MYCETOPODA SUBSINUATA Sowerby.

* *Mycetopus subsinuatus* SOWERBY, Conch. Icon., XVI, 1868, pl. IV, fig. 10.—* CLESSIN, Conch. Cab. Ano., 1875, p. 205, pl. LXVII, fig. 3.—* P.ETEL, Conch. Sam., III, 1890, p. 187.—* FISCHER, Jl. de Conch., XXXVIII, 1890, p. 8.

Bogota; Colombia; Equador.

†MYCETOPODA PYGMÆA Spix.

* *Anodon siliquosus* var. *b pygmæum* SPIX, Test. Fluv. Bras., 1827, p. 30, pl. XXIII, figs. 3, 4.
* *Mycetopus pygmæus* SOWERBY, Conch. Icon., XVI, 1868, pl. II, fig. 4.—* CLESSIN, Conch. Cab. Ano., 1875, p. 205, pl. LXX, fig. 3.—* P.ETEL, Conch. Sam., 1890, p. 197.—* FISCHER, Jl. de Conch., XXXVIII, 1890, p. 8.
* *Platiris* (*Mycetopus*) *pygmæus* LEA, Syn., 1870, p. 90.
† *Mycetopus weddellii* HUPE, Moll. Nouv., III, 1857, pl. XX, fig. 2.—* SOWERBY, Conch. Icon., XVI, 1868, pl. II, fig. 5.—* CLESSIN, Conch. Cab. Ano., 1875, p.

[1] Probably a wide variety of *M. siliquosus*.

[2] I have never seen this species, and the author only gives two rough interior outline figures, but its form is so much like that of *siliquosus* that I somewhat doubt its specific value

203, pl. LXVI, fig. 6.—* FISCHER, Jl. de Conch., XXXVIII, 1890, p. 8.—* PÆTEL, Conch. Sam., III, 1890, p. 187.

Brazil; northward to Nicaragua.

MYCETOPODA HUPEANA Clessin.

* *Mycetopus pygmæus* HUPE, Moll. Nouv., III, 1857, p. 93, pl. XIX, fig. 2.
* *Mycetopus hupeanus* CLESSIN, Conch. Cab. Ano., 1875, p. 206, pl. LXVI, fig. 15.—* FISCHER, Jl. de Conch., XXXVIII, 1890, p. 8.

Brazil.

(Group of *Mycetopoda ventricosa.*)

Shell rather short and high, inequilateral subrhomboid with a strong angle at the anterior upper point, cut away below in front, slightly sinuous on the base, narrower behind, strongly truncate on posterior slope; posterior ridge wide and lightly curved, hinge line curved.

Animal unknown.

†MYCETOPODA VENTRICOSA d'Orbigny.

* *Mycetopoda ventricosa* D'ORBIGNY, Voy. Am. Mer., 1843, p. 602, pl. LXXII, figs. 1–3.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 505.—* SOWERBY, Conch. Icon., XVI, 1868, pl. III, fig. 8.—* CLESSIN, Conch. Cab. Ano., 1875, p. 202, pl. LXIX, figs. 2, 3.—* FISCHER, Jl. de Conch., XXXVIII, 1890, p. 8.—* PÆTEL, Conch. Sam., III, 1890, p. 187.
* *Platiris* (*Mycetopus*) *ventricosus* LEA, Syn., 1852, p. 56; 1870, p. 90.

Bolivia.

(Group of *Mycetopoda soleniformis.*)

Shell large, rounded in front, but somewhat truncated on the lower anterior part; base line evenly incurved; posterior ridge well developed, curved, truncate on posterior slope; beaks central.

Animal that of the genus.

†MYCETOPODA SOLENIFORMIS d'Orbigny.

* *Mycetopoda soleniformis* D'ORBIGNY, Guer. Mag., 1835, p. 41.—* CHENU, Ill. Conch., 1858, pl. I, figs. 1, 1*a*, 1*b*.
* *Platiris* (*Mycetopus*) *soleniformis* LEA, Syn., 1838, p. 34; 1852, p. 56; 1870, p. 90.
* *Mycetopus soleniformis* REEVE, Conch. Syst., I, 1841, p. 125, pl. XCIV.—* HANLEY, Test. Moll., 1842, p. 224; * Biv. Shells, 1843, p. 224.—* D'ORBIGNY, Voy. Am. Mer., 1843, p. 601, pl. LXVI.[1]—* CATLOW and REEVE, Conch. Nom., 1845, p. 69.—* H. and A. ADAMS, Gen. Rec. Moll., II, 1857, p. 505; III pl. CXVIII, figs. 2*a*, 2*b*.—* CHENU, Man., 1859, II, p. 147, fig. 725.—* REEVE, Elements of Conch., II, 1860, pl. XXXII, fig. 181*a*, *b*.—* SOWERBY, Conch. Icon., XVI, 1868, pl. I, fig. 1.—* CLESSIN, Conch. Cab. Ano., 1875, p. 201, pl. LXVIII, fig. 1.—* FISCHER, Jl. de Conch., XXXVIII, 1890, p. 7.—* PÆTEL, Conch. Sam., III, 1890, p. 187.
* *Mycetopus solenoides* SOWERBY, Conch. Man., 1839, fig. 151.
* *Margaron* (*Anodonta*) *soleniformis* LEA, Syn., 1852, p. 53.
* *Platiris* (*Mycetopus*) *soleniformis* LEA, Syn., 1870, p. 90.

Bolivia; Peru.

[1] 1843 was the date of issue of the last part of the voyage. The description of *Mycetopus* in this work appeared earlier.

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